THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LXXXVI. No. 2139.] LONDON, MAY 10, 1904. [56TH YEAR. PRICE 6d.

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— ESTABLISHED 1830. —

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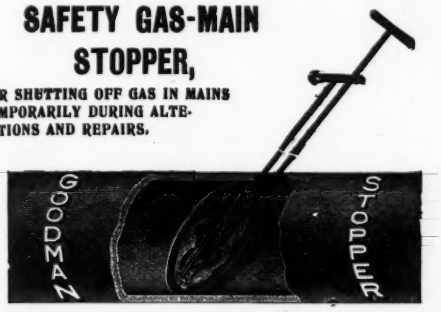

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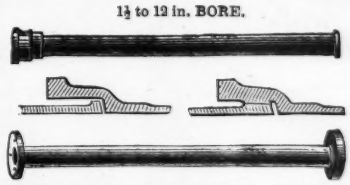

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RETORT SCURFER

Saves its Cost many times each Year.

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WRITE FOR FULL PARTICULARS.

RESULTS GUARANTEED.

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GENTLEMEN,

We have now had your Retort Scurfer at these Works for over Twelve Months, and having tried several forms of de-scurfing Retorts, we have no hesitation in saying that it is by far the best Apparatus we have tried for this purpose. **Two men have several times drawn a Setting of Seven Retorts, thoroughly cleaned the same, and charged the Retorts again within 6½ hours.** As a matter of fact, it is unnecessary for a Retort to be out of use more than 40 minutes for scurfing purposes if your apparatus is used.

After being subjected to the blast of steam and air which is injected, the scurf is easily removed with a bar without violence and consequent damage to the Retort itself.

I am, yours faithfully,
(Signed) J. H. BREARLEY.

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Works: DARLINGTON.

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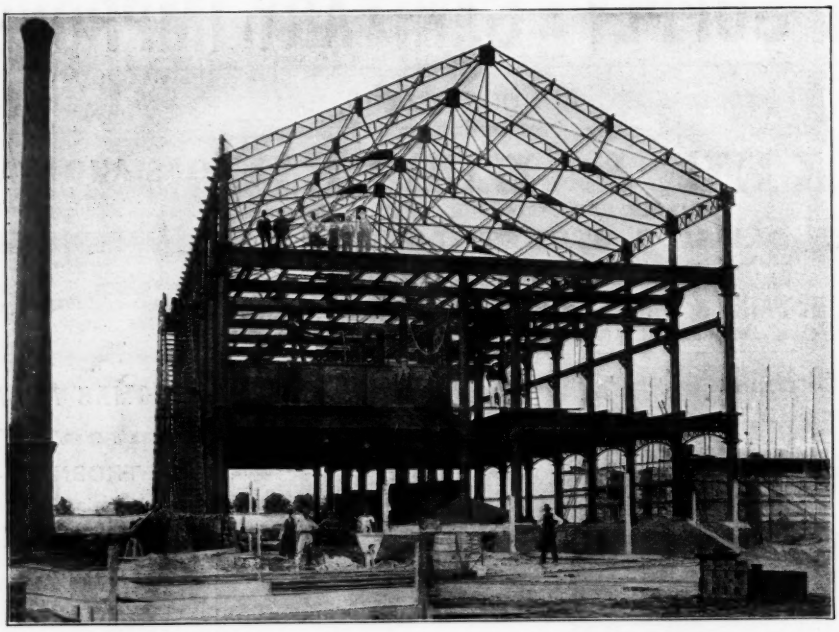

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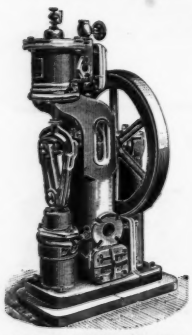

Fig. 705. "SINGLE RAM" STEAM-PUMP.

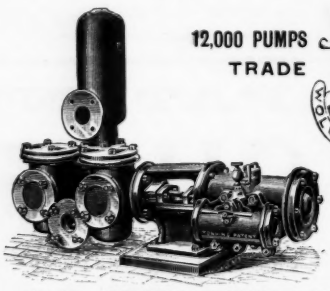

Fig. 598. "CORNISH" STEAM-PUMP FOR BOILER FEEDING, &c.

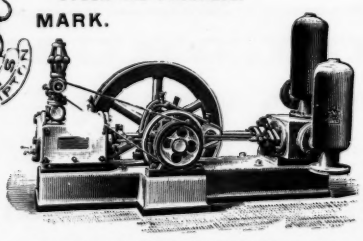

Fig. 685. "RELIABLE" STEAM-PUMP FOR TAR AND THICK FLUIDS.

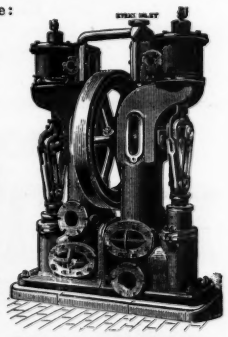

Fig. 712. "DOUBLE-RAM" STEAM-PUMP.

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PUMPS,
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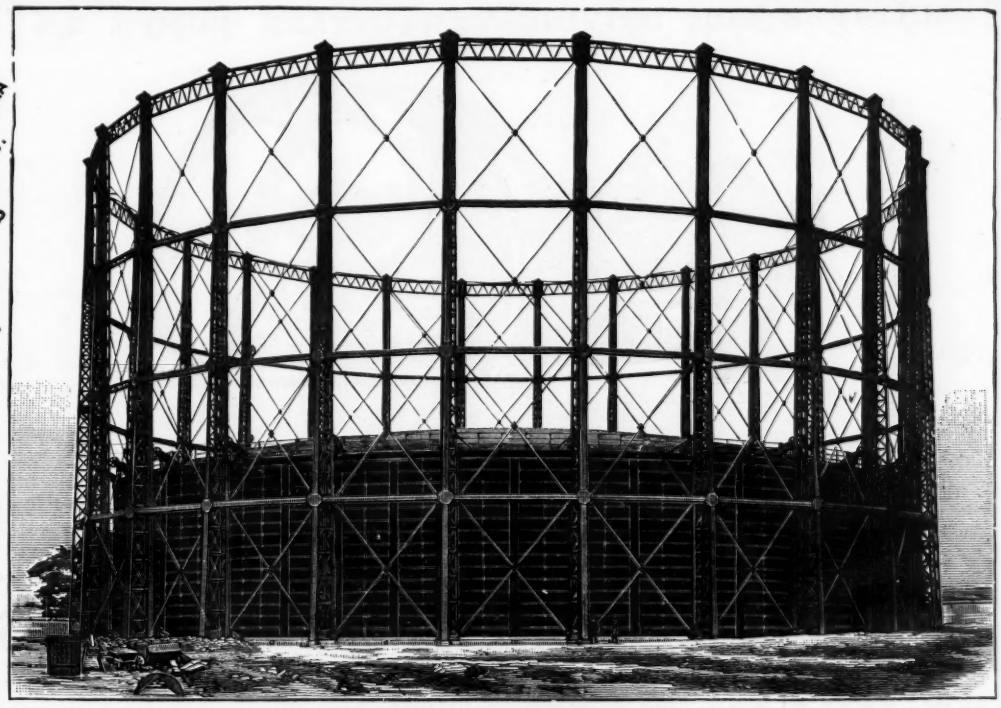
RETORT-
FITTINGS,
ETC.



TELEGRAPHIC ADDRESS: ATLAS BIRMINGHAM

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Simplicity.
No Chains.

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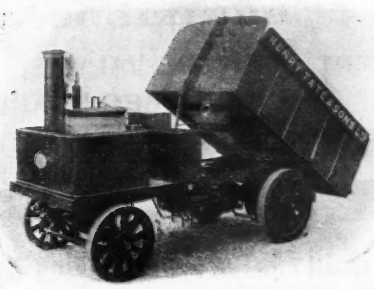

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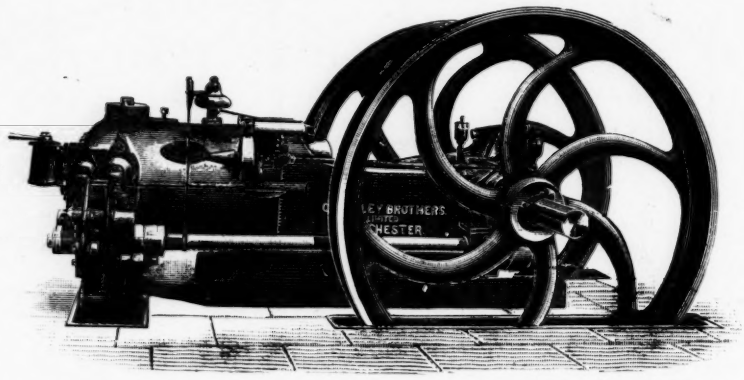

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and have been unanimously requested by the Council to take over the Public Lighting of the Town. **Millbay Docks and Harbour for the Great Western Railway Company.**

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50 per cent. cheaper than Incandescent Gas.
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600 per cent. more light than ordinary fish-tails at **HALF THE COST.**

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We have hundreds of Installations running; and we have never had a failure, and never a complaint.

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PHOTO. OF REGENERATOR SETTINGS DURING CONSTRUCTION.

REGENERATOR & GENERATOR SETTINGS

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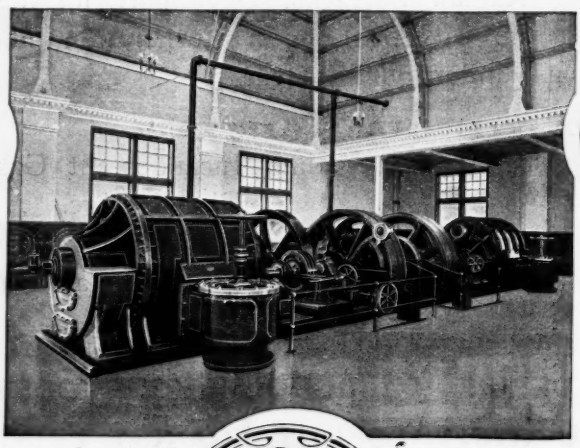

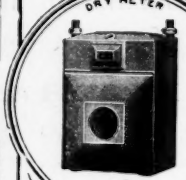

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CHARGING AND DRAWING MACHINES;
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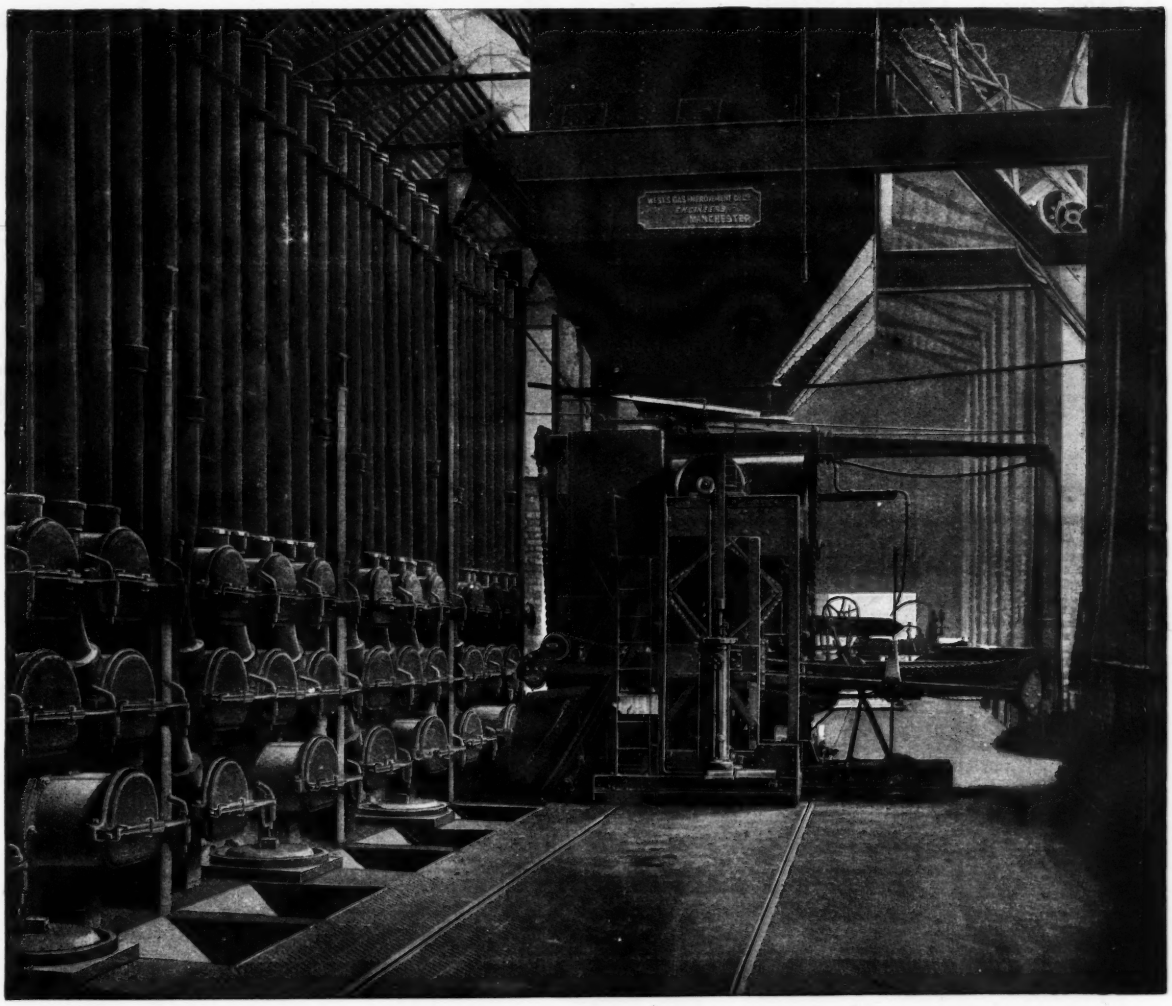

West's compressed Air Driven Charging and Drawing Machine, requiring only One Machine driver and one attendant to charge and draw the Retorts, attend to the Mouthpieces, and fill the Furnaces.

All classes of Coal can be efficiently dealt with by the West's Charging Machines, and the Retorts are charged evenly throughout with the full weight of Coal.

Retort-Houses fitted with West's Regenerator Furnaces, Stoking Machinery, and Coke Conveyors reduce the cost of Carbonizing Coal to a minimum.

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BURY	1,000,000	PINNER	250,000
SUTTON	1,000,000	HERNE BAY	250,000
GLOUCESTER	1,000,000	PELTON COLLIERY	250,000
SCARBOROUGH	1,000,000	TUBORG	250,000
GUERNSEY	750,000	AALBORG	250,000

PATENT "STANDARD" WASHER-SCRUBBERS

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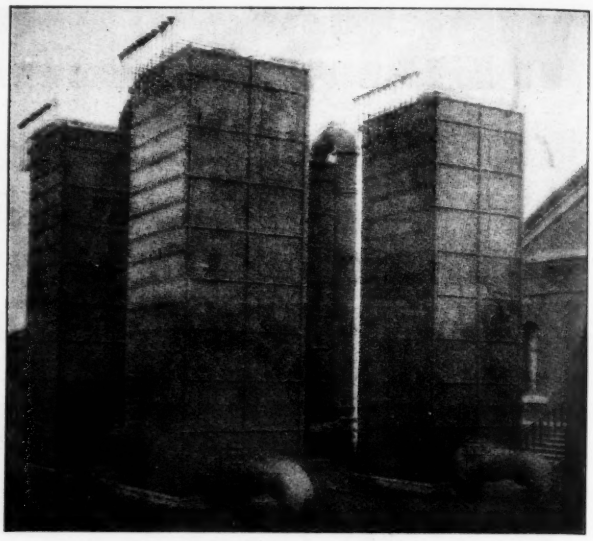

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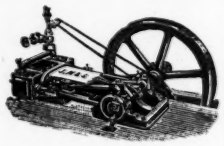

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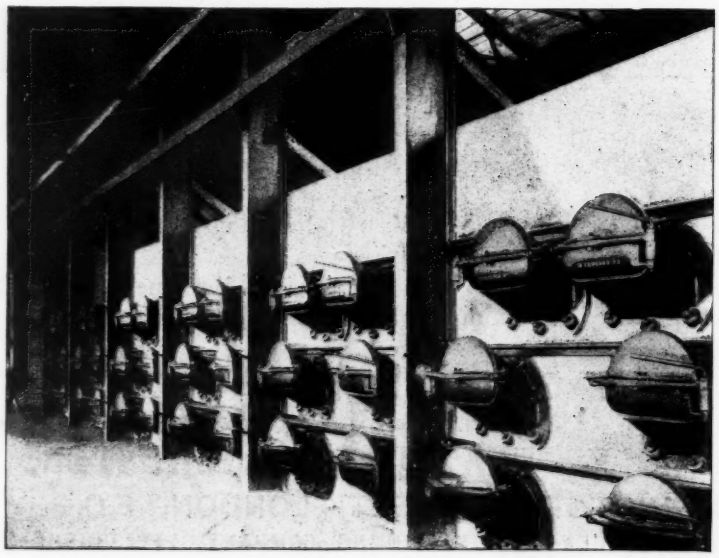

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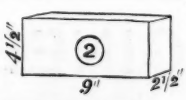

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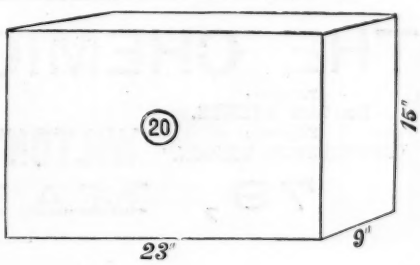

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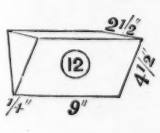

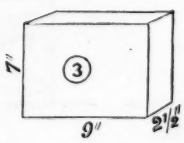

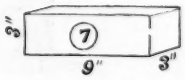

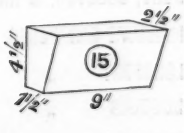

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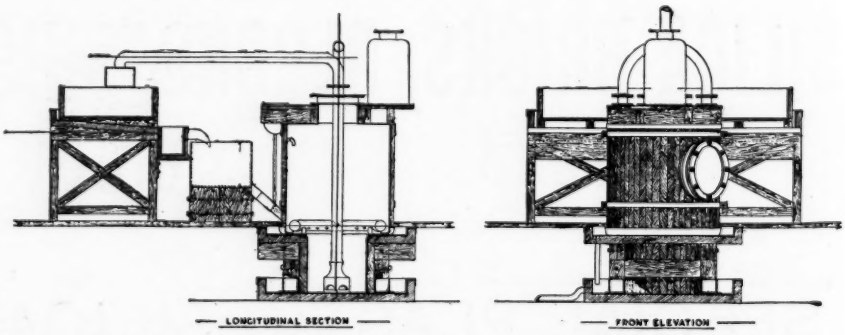

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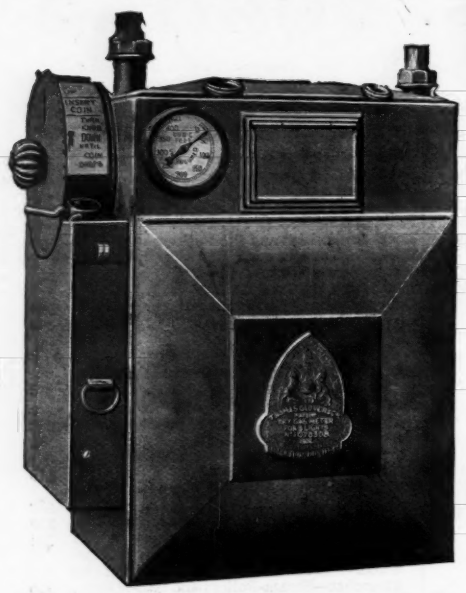

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VOL. LXXXVI., No. 2139.—TUESDAY, MAY 10, 1904.

EDITORIAL NOTES—GAS, &c.

Gas Companies and the Royal Commission on London Traffic.

GOOD service has been rendered to the London Gas Companies by the appearance before the Royal Commission on London Traffic of Mr. H. E. Jones, in his capacity of Chairman of the Gas Companies' Protection Association, and as a Director of the Commercial and Wandsworth and Putney Gas Companies, and of Mr. G. F. L. Foulger, the Distributing Engineer of the Gaslight and Coke Company. The Gas Companies of London have—however much unmerited—none too good a character in the minds of the public in connection with the disturbances during recent years of street surfaces and the derangement of vehicular and public traffic and business. There was just the danger that the view of the public in this respect might be that of the members of the Commission. Whether this be so or not, there is not the least doubt that the representatives of other public services and bodies who may have been before the Commission have not done anything to lighten, or make clear the smallness of, the share of the Gas Companies in the responsibility, as compared with the telephone authorities and electricity companies. It was, therefore, necessary that a very clear and accredited statement of the facts should be laid before them; and it must be said that both the President of the Institution of Gas Engineers and Mr. Foulger acquitted themselves of their task with adroitness and cogency. This, of course, one would expect from them, with their life experience of gas distribution in London and elsewhere.

The report of the evidence published to-day will be found worth reading, not only by those directly interested in the London Gas Supply, but by those concerned in the other public services. And especially will it be a good thing if the Authorities of the Metropolis have this particular testimony brought before them, and something effective results in the direction of prompting them to mend their ways—in the event of Parliament not laying down a code of rules by which the operations and methods pertaining to the use of the subsoil of the streets are to be regulated. Notwithstanding the deservedly severe things that Mr. Jones has to say about the Local Authorities, and the manner in which street works are carried out by them or those with whom they contract, his relations with them so far as the use of the streets are concerned have evidently been of a very pleasant character, for he is quite willing that, in the event of disputes in connection with street works between those occupying the subsoil, their contractors, or the tenants of the premises in any particular locality, the Borough Surveyor shall act in the capacity of referee. Mr. Foulger is agreeable to a standing arbitrator being appointed; but, of course, the necessities would demand that he must be someone who is readily accessible.

Mr. Jones sets himself dead-against the construction of subways as being a clumsy, costly, and dangerous device for doing away with the opening of roads; and he makes some alternative suggestions, which, if not altogether new in their general aspects, have originality in certain of their features. There is something, however, a little bit visionary in the idea that, in order to reduce the chances of prospective openings of the roadway in the case of arterial mains, and so perhaps save the next generation an amount of inconvenience, the Local Authorities should make a contribution towards the cost incurred by the Gas Companies in putting in pipes of a size in excess of the likely carrying requirements. When the Local Authorities of London can be induced to contribute towards the purchase of property for the Metropolitan Gas Companies, then, indeed, will the Millennium have arrived. However, it will certainly not be Mr. Jones's fault if he did not enlighten the Commissioners, and undermine parts of the previously received evidence, as well as certain of the clauses contained in Part II. of the City of London (Streets) Bill of 1902. In many respects, Mr. Foulger's evidence supplies a capital supplement to that of Mr. Jones—corroborating by important figures and other facts the truth of the oft-repeated assertion as to the Gas Companies being now, in the important parts of London, the least offensive among the several aggressors of the rights of the public to the free user of the streets.

Fault Found with the Valuation Bill.

THE subject of rating is one that touches gas companies in the most sensitive part of their anatomy—if corporations can be truly said to have "parts" at all. Consequently, the character of the Valuation Bill is a matter that is likely to interest very closely those gas engineers who are authorities on assessment. Already some representatives of large ratepayers are making themselves heard on the subject; and we have, in particular, received a very strongly-worded protest against certain portions of the new Bill from the Machinery Users' Association. The chief complaint of the Association is that the Bill proposes to make municipalities their own Overseers, Assessment Committees, and Valuation Authorities. Bearing in mind the lengths to which many local authorities go in respect of trading, it is felt that this temptation to such bodies to make things comfortable for themselves at the expense of their commercial rivals will be more than they should be exposed to.

It is difficult to form an opinion of how this matter stands, exactly. Possibly some light may be thrown upon the subject by the action of the Metropolitan Boroughs. It is reported that these bodies are by no means pleased with the position in which the London County Council are placed in regard to them by the Bill as printed. Meanwhile, all these Metropolitan rating authorities have met in conference over the approaching quinquennial valuation, with the laudable object of securing uniform assessment among themselves. On this auspicious occasion, the Chairman of the London County Council mentioned the probability of the Valuation Bill passing this year, and he trusted that the Metropolitan Authorities would bring all their expert experience to bear upon it, "so as to make it worthy of its progenitor." He did not say who this was; but it needs no magic to perceive that the Bill may well be regarded most favourably by the County Council. Probably more will be heard on this head on a future occasion, as the consideration of the Bill was postponed until the next meeting of the conference, fixed for Friday this week.

Matters are moving along with some rapidity in regard to this measure; so that if the Gas Companies' Protection Association wish to be heard upon it, there should be no time lost. Apart from the constitutional question, the most important feature of the Bill is its proposal to apply throughout England and Wales the device of quinquennial revaluation, which has been in operation in London for many years. Like other human inventions, this is far from being perfect; and especially in regard to gas properties it has been found to work very rough justice indeed. There is no doubt that in some parts of the country the revision of the valuation lists has been sadly neglected—sometimes from interested motives; and the necessity for correcting this defect of the existing procedure has caused the Government to propose the general adoption of the quinquennial valuation. It is doubtful, however, if this is really necessary everywhere. There have been revaluations of recent date in some places, entailing considerable expense; and to do the work all over again, upsetting every decision lately come to, merely for the sake of arriving at a crude uniformity, seems a superfluous labour and outlay. Besides, a simultaneous valuation of the whole of England and Wales would be a task of enormous difficulty, quite possibly entailing the entrusting of the work in many localities to unfit persons. Probably, by the time the second reading of the Bill is reached, the Local Government Board will be in possession of a considerable body of criticism of its provisions, which will have to be duly regarded by them.

A Gas Lawsuit in the House of Lords.

It is rather a long time since any gas lawsuit has been regarded as sufficiently meritorious to be carried to the House of Lords—a distinction to which, according to the saying attributed to a typical family solicitor, all respectable lawsuits should reasonably aspire. Actually, however, the Law Lords are considering their judgment in the case of the *Cannon Brewery Company, Limited, v. The Gaslight and Coke Company*, which raises in an interesting manner the ancient question of the liability of an incoming tenant for the unpaid gas account of his predecessor. In ordinary circumstances, of course, this liability is abolished by statute; but there are exceptions, and it appeared to the Gas Company that this was one of the number. It was a case of licensed premises, which also happened to become a "tied house" by the succession in occupation of the Brewery Company. The outgoing tenant did not pay his gas account, amounting to £10 1s. 3d. The incoming tenants did not require a supply of gas; but nevertheless the Gas Company contended that they were liable to pay the amount owing, because they were continuing the trade which they had taken over for a consideration from the previous occupier. The case was originated in the Clerkenwell County Court, and the Gas Company lost. On appealing to the Divisional Court, the ruling of the County Court Judge was upheld. The case was then taken to the Court of Appeal, where the decision was reversed. The difference between this and earlier cases of the same kind lay in the circumstance that the appellants did not want a supply of gas, so that cutting-off had no terrors for them. Now, according to the argument put forward on their behalf, the fact of their not requiring a supply of gas ended the liability. It was so argued by Mr. C. A. Russell, K.C., for the Brewery Company; his contention being that if the incoming tenant is not in a position to "require" a supply of gas, then the whole of section 18 of the Gas Company's Act of 1872 does not apply to him. The only similar case on record appears to be that of *The Gaslight and Coke Company v. Mead*, which was decided in 1876 in favour of the respondent. It is rather difficult to understand the judgment in Mead's case; for, though the Court held that the respondent was not personally liable for the arrears of his predecessor, the Company might refuse to continue the supply unless they were paid. Clearly, the continuing business is the main consideration; and it might be regarded as obvious that in the particular case of licensed premises the factor is of far greater importance than in any other line of business. The Gas Company are justified, in all the circumstances, in trying the matter out to the end. The issue would probably be plain enough had it not been for the decision in Mead's case, which is apparently what is troubling their Lordships.

The Vitality of the Imperial Continental Gas Association.

The plaint of the Chairman of the Imperial Continental Gas Association (Mr. J. Horsley Palmer), at the meeting last Tuesday, that—because nothing of any special moment had occurred in the past half year—he felt somewhat in the position of the Israelites when they were asked to make bricks without straw, must, upon the finish of his address, have struck many of the proprietors as being more humorsome than sincere. Unlike the Israelites, Mr. Palmer was not labouring under the disadvantage of being in captivity; and therefore he was able to look about him for the necessary material. He had not to go far to find it; and the result was one of the most fascinating speeches from the chair to which it has been the good fortune of the proprietors to listen. Good speeches they have heard in great numbers at the meetings; but never one that has more forcibly disclosed to them the magnificent recuperative power of their undertaking. It is, too, improbable that any other concern could (through the lack of opportunity that is undesirable) provide such an elaborate illustration of the vitality of the gas industry. Just consider this. In 1897, the Association were supplying with gas the whole of the cities of Amsterdam and Vienna; these undertakings representing £2,250,000 out of the total invested capital of £4,900,000. Next year the Amsterdam undertaking was sold for its full value; and the succeeding year, under well-known circumstances, two-thirds of Vienna had to be relinquished. In the six years since 1897, the Association have had to spend no less than £2,000,000 in providing for the growth of their business at their many other stations; so that the invested capital now approximates that existing before the loss of Amsterdam and the two-thirds of Vienna. But the tale does not end there. In 1897 there were 220,000 customers on the books of the Association, including Amsterdam and the whole of Vienna; to-day they have 270,000 consumers, or 50,000 more than when they were lighting those cities! And all this has been made up in six years! A considerable number of the new consumers, however, are on the slot system, and the average consumption has consequently diminished; but, notwithstanding, the total consumption is now within 10 per cent. of what it was in 1897. The quantity of gas made last half year reached the enormous figure of 4556 million cubic feet; the increase on the corresponding period being 4·5 per cent. This shows that it will soon be the Chairman's privilege to announce to the proprietors that once more the record consumption of the (for the proprietors) memorable year of 1897 has again been reached. Such a remarkable disclosure of the prosperity of the gas industry on the Continent is an excellent answer to those who, when they feel safety in having ignorance before them, speak airily of the process of decay having at length set in for the gas industry on the Continent in face of the "superior" claims and charms of the electric light.

Checking the Increase of Municipal Debt.

The observations of the Chancellor of the Exchequer in the course of his recent Budget speech, as to the desirability of some check being applied to the growing greediness of local authorities for capital which has to be raised by borrowing at a continually rising rate of interest, have given great umbrage to the municipalizing party in local government. At least, so much is to be gathered from the aggrieved tone of many newspaper references to the subject; though it is only fair to admit that no prominent spokesman of British Municipal Corporations has so far ventured to complain of Mr. A. Chamberlain's remarks in the House or out of it. As might have been expected, the recent oversubscription of the new London County Council loan has been quoted for far more than it was worth as evidence of the unlimited credit of this class of borrowers; but the circumstances of the prospective indebtedness of the Marylebone Borough Council for the purchase of an undertaking which they could very well have done without, comes as a serviceable reminder of what it is that the Treasury officials, speaking by the mouth of the Chancellor of the Exchequer, really object to. It is not that any large proportion of the local national debt of the country is sunk in unprofitable ventures. Indeed, such an assertion would not be true. It is, rather, that the ambition of the local authorities to improve their surroundings and to engage in trade has too often to be gratified at the expense of the credit of others. In the case of what threatens to be the classical example of the Metropolitan Borough of Marylebone, for instance, it is certain that the credit of the borough alone would not bear the strain of the heavy extra indebtedness which the Council must incur, to pay for a property which they might with advantage have left alone. Consequently, the London County Council have to come to the assistance of the Borough Council. The case not being one of necessity, this is not fair to other borrowers who are seeking to benefit from the superior credit of the higher authority. In the case, to name a similar transaction, of the unnecessary transfer of a gas undertaking to a local authority—which, as recent experience amply proves, is a costly kind of purchase—there is an increase of public indebtedness for little or no gain to anybody. There is some justification for the municipalization of public supplies and services when it can be proved to demonstration that money will be saved thereby. The same plea justifies industrial amalgamations, whereby working expenses will be reduced. But the megalomania of the so-called "Trust" system, which benefits nobody except a few magnates who do not know when to cease from accumulating riches, is as much to be resisted as the grasping municipalism which cannot rest so long as a private company exists within its district. If the more headstrong local authorities were left to their own resources in the way of credit, they would in numerous instances have to sing very small indeed. As it is, they have enjoyed the benefit of the superior credit of the National Government or the County

Councils, practically as a matter of course. This freedom has in many examples been abused; and it must henceforth be more jealously guarded. Those who pretend, with some newspapers, that "no case has been made out for restriction "of any kind," must close their eyes to such instances of reckless municipal adventure as that of the Marylebone Borough Council.

Singular Proceeding of the Leeds Gas Committee.

For an illustration of the propensity of Trade Union domination of any branch of industry to grow by what it feeds on, it would be hard to beat a report that comes from Leeds concerning a recent confabulation between the Corporation Gas Committee and a deputation from the Leeds Trade and Labour Council. This influential deputation had a complaint to make of one of the contractors for machinery to the Committee, under the famous "fair contracts clause." It was that the firm in question did not allow their men a break between the starting of work at seven o'clock and noon. The deputation contended that the custom of every other engineering firm was to have two breaks in the day, breakfast and dinner; and that as this particular firm did not comply with these conditions, they ought not to have the contract. The upshot of this protesting was that the question was referred to the Town Clerk, with instructions to communicate with the offending firm, and ask them if they were prepared to sign the contract with a clause as desired by the deputation! It is difficult to characterize with proper reserve this way of doing municipal business—if the transaction is correctly reported. For what, in the name of common sense, is the good of people endeavouring to improve the condition of British manufacturing industry, if every firm is to be kept to heel by labour leaders? The introduction of the one-break working day, which is general on the Continent, is an experiment in workshop organization which certain British firms have tried, like others, to see if it will benefit the trade. The reason for the change is perfectly well known to workmen; and one would naturally think that whether or not a man goes to work at a one-break shop is purely a matter for himself to decide. But no. Leeds is blessed with a Trade Union organization which knows better than that. It will have no reform of the good old fashion of "losing quarters," whenever their high mightinesses, the tradesmen, may think fit to exercise this ancient liberty. The Continental custom of locking the gates at seven o'clock, not to be opened for half the day, is repugnant to the kind of workman who is the mainstay of Trade Unions, Labour Federations, Trade Councils, and all the rest of the organization for the subjecting of employment to Labourist tyranny. Consequently, the machine is set in operation, and the Town Clerk of Leeds must move as directed. Why the Leeds Gas Committee had no more backbone than is reported, is something that should be explained. If they acted for the best in this matter, and according to their convictions, they, of course, will have nothing to be ashamed of; but, on the face of it, their consent to the impudent suggestion that the fair wage clause of municipal contracts is broken in the manner alleged, looks like pusillanimity, or worse. Far better would it be for the Committee to get their contracts placed in Belgium or Germany, like the London County Council, where the Trade Unions, if they exist, do not make the sacred right of the workman to lose quarters a plea for depriving masters of the means of paying any wages at all. And to think that while British employers of labour are subjected to this waste and discouragement, with the connivance of Municipal Corporations and by the instrumentality of Town Clerks, there are amiable theorists who tell the world that it is because they despise the metric system that work is leaving them! Only Mr. W. S. Gilbert could adequately set out the humours of the situation.

The Welsbach Report—Dividend and Encouragement.

The report of the Directors of the Welsbach Company, which has been anticipated with no little curiosity, was issued to the shareholders last week; and it must have been received by the majority of them with no little satisfaction, not only for what it gives them in the present but for the encouragement that it holds out for the future, as the result of the drastic defecation of the concern in the past twelve months. Including the dividend for the year 1902-3 upon the Company's holding in the Austrian undertaking, a profit of £102,113 is shown; and, deducting the debenture interest, there is a balance of £98,048. Under the scheme of reorganization and the amended Articles of Association, only profits earned after the registration of the order and minute of the Court approving the reduction of the capital are available for distribution as dividend. Approximately £45,000 of the profits were made prior to August 14 last—the date of the registration of the minute; and the Board have wisely determined to apply this towards the establishment of a general reserve fund, to be invested outside the Company's business. From the balance of £53,048, the Directors recommend the payment of a dividend (for the period since August 14) at the rate of 6 per cent. on the preference shares and of 7½d. per share, which is equivalent to about 5 per cent. per annum for the like period, on the ordinary shares. The payment of these will leave £7077 to be carried to the credit of the current year's accounts. The reorganization expenses, amounting to £2123, have been charged against the profits of the year. Notwithstanding the internal troubles and anxiety of the year, and the reductions in prices, the result of the English business shows an advance in net profit of £15,739 over the previous twelvemonth. There is a considerable amount of interesting information in the report, which will no doubt come under review at the meeting of the shareholders next Monday, and so will then be noticed in our report of the proceedings. Meanwhile, it should be mentioned that Mr. M. W. Mattinson, K.C., has been elected to the chairmanship of the Company in place of the late Mr. Edgar Williamson; Major George Pringle (who has been one of the Company's representatives on the Austrian Board) has been appointed to the vacant seat; in order to have more time to devote to the affairs of the Austrian Company, Mr. K. H. Buchanan has retired from the position of Managing-Director, while retaining his seat on the Board; and now the whole executive responsibility for the management of the Company devolves upon Mr. Laurence Fletcher, who, as most readers know, has been closely and continuously identified with incandescent matters over a long course of years.

The Folly of Hastings.

It is not many weeks since we drew attention to the extraordinary disinclination displayed by the ratepayers of Hastings to look properly after their own interests in the matter of the Corporation electric light undertaking. This has been a notoriously bad speculation; though the true state of affairs has been to some extent obscured by the adoption of an expensive public lighting system. Apparently this process of "improving" the condition of things is still going on, for we notice that gas-lamps are now being superseded in quite an outlying part of the district. The proposal in the first place was to fit up the lamps on the incandescent gas system, in which case the cost would have been for 50-candle power lights £3 4s. each net per annum (that is, deducting the coal and coke dues and rates paid by the Company); whereas the charge for 16-candle power electric lamps is to be £3 10s. each. If such a proposal as this can be carried through without rousing a very hornet's nest of angry ratepayers, the case must be hopeless. To charge themselves a higher price than the Gas Company ask, and to be content with lamps giving about a third of the light, does not speak well for the business capacity of the inhabitants of Hastings. But, after all, the whole thing is delightfully simple. It is, as a local paper remarks, merely another instance of the plan of making the public pay for the deficit caused by supplying private consumers at a price which does not ensure a profit. Will not some kind friend suggest to the Corporation of Hastings that if they would only charge themselves double the present amount for the public electric lamps, they might not only wipe out the deficit, but show a substantial profit into the bargain, which could be allocated to the relief of the rates?

Advantages of Gas Over Electricity.

The ratepayers of Hastings (and other places) might derive substantial benefit from a careful study of a dispassionate article by Mr. W. H. Booth in the May number of "Cassier's Magazine," which deals with the "Advantages of Modern Gas Lighting over the Electric Light." After remarking that the present condition of gas lighting is such that the mantle bars the way to any further

improvement, but that with better mantles there can be better efficiency, the author says that with one of the existing systems 1000 cubic feet of gas, at 3s., will produce 36,000 to 40,000 candle-hours, or 1000 to 1100 candle-hours for 1d.—that is to say, fully 20 hours of 50-candle power for 1d. He adds that users of electricity may compare their bills on the basis of three lamps of 16-candle power each, run for 21 hours, and they will perceive how exceedingly extravagant a light is that from electricity. The only advantages he claims for electricity are those of convenience and health; and even the last-named of these he admits is not insurmountable, inasmuch as the economy in one year over electricity would pay for the ventilation necessary to remove the products of combustion. With regard to the oft-repeated statement that gas at 3s. per 1000 cubic feet is equal to electricity at 6d. per unit, Mr. Booth points out that this, of course, is with flat-flame burners. Welsbach mantles, with gas at the same price, compare with electricity at 1d. per unit; while with some gas systems the cost of electricity must come down to a still lower figure to bear favourable comparison. What Mr. Booth has to say is already well known to gas engineers; but the inclusion of the article in a magazine devoted to general engineering subjects is likely to carry weight with the public. We therefore note its appearance with a considerable amount of pleasure.

Gas Profits at Manchester.

One result of the attention that has been drawn to the prospective increase of the rates in Manchester is recorded elsewhere to-day—namely, a promise by the Gas Committee to increase their contribution from £50,000 to £60,000. The first-named figure was already an altogether disproportionate return to the ratepayers for any risks they might be imagined to have incurred in the purchase of the undertaking; and though even the larger sum may perhaps be excused by the trying position in which the Corporation find themselves, it is easy to understand that dissatisfaction may be felt on the part of the consumers at the handing over of these big profits to benefit those who do not burn gas, but, on the contrary, possibly use electricity obtained from the Corporation at about cost price. This feeling will not be allayed by the reflection that over £2,500,000 has been appropriated out of the rofits of the undertaking since it became municipal property, and that, as pointed out by Alderman Gibson, every penny that the concern cost has come out of the pockets of the consumers, and not out of those of the ratepayers as such. It is true that the additional £10,000 to be contributed on the present occasion is to be taken from the contingent fund and from a sum set aside for building purposes outside existing borrowing powers. But this does not in any degree lessen the unsoundness of the principle that the gas consumers should be called upon (by paying a higher price for gas or by the depletion of their funds) to contribute in two ways—as gas consumers and also as ratepayers—to the extra sum needed to be levied, whereas the non-consumers only have to do so once, as ratepayers. If such a means of getting over a difficulty were often adopted, it would work even greater hardship on the consumers than they at present have to bear. There are, of course, many objections to be urged to the transference under any circumstances of large sums from the profits of municipal gas undertakings in aid of the rates. If the gas consumers alone pay for the works, surely they may fairly be held to belong solely to them. It would then be open to any ratepayer to derive benefit from the property by becoming a consumer of gas. If he did not choose to participate in the distribution of cheap gas, that would be his own fault.

Payment for Municipal Gas-Works.

If, however, it is held that the ratepayers generally are entitled to benefit as such from the ownership of the gas undertaking, then it certainly is not right that the gas consumers alone should pay for the works. This point has been raised at Dukinfield by a former Elective Auditor, who argues that, as the works are a municipal undertaking, the purchase price should be provided out of the rates, as every ratepayer is a joint owner. But this, of course, is not done, as the sinking fund is taken out of the revenue; and the consequence is that the gas consumers alone are being made to pay for the concern. It is pointed out that the benefit of this to the individual non-consumer who lives in a cottage rented at from 2s. 6d. to 6s. a week is from a farthing to a half-penny per week; while the gain to the large ratepayer who does not consume gas is considerable. Medium ratepayers and large ratepayers who consume gas also benefit to the extent of the difference between what they pay in the price of gas towards the sinking fund and what they would have to pay if the money were taken from the rates. The cottage consumers, who use over 60 per cent. of the gas, have necessarily to find the greater portion of the money required; and this would, of course, not be the case if the sinking fund was provided out of the rates. This the gentleman in question terms an "injustice"—and so it is if, in addition to paying for the works, the gas consumers are to be expected to hand over a large sum of money yearly for the benefit of those of their fellow townspeople who have not contributed a single halfpenny towards the acquisition of the undertaking. It should be a case of one thing or the other. Either the consumers should buy the undertaking for their own benefit, or the ratepayers generally should find the money, in which case they could reasonably claim a fair return on their outlay. The former plan could seem to be the best one to adopt; but whether this is so or not, there can be no real justification for mixing up the two—that is, making the gas consumers buy the undertaking, and then letting the ratepayers as a body benefit directly from the purchase.

Counsel for the Gas Consumer.

The Plymouth and Stonehouse Gas Company, whose enterprising spirit has been frequently noticed, are sending out with the quarterly accounts a circular bringing under the notice of the consumers a new departure in connection with the business which may prove very helpful to them. The circular (which is signed by Mr. H. B. Heath, the Secretary) sets forth that the Company find consumers would like from time to time to have the opportunity of consulting an expert in gas heating, cooking, or lighting, but hesitate to take the necessary step because of the implied obligation to give an order for the work. To meet this requirement, the Company have made arrangements to place at the disposal of the consumers the advice of a competent expert, free of charge and of any obligation whatever to buy or order. If, therefore, any consumer would care to have advice for improving his arrangements for lighting, cooking, or heating, every assistance will be given to him on receipt of a post card with his name and address. It is to be hoped the customers of the Company will not fail to recognize the advantages of this offer. There are innumerable cases in which efficiency might be promoted and economy studied, by the application of just such assistance as the Company offer. Every householder does not know how to get the best results from the gas he consumes; and as it is to the Company's interest that he should be not only a customer but satisfied with the article he is purchasing, they are acting wisely in offering him advice. Their new policy should do something to promote that more intimate relation between the seller and the user of gas which for many years past it has been the object of gas managers to promote. An opportunity of useful work in this direction was afforded by the introduction of the system of maintaining incandescent mantles and burners. The present movement carries it a step farther.

Free Attention to Consumers' Burners.

The enterprising introduction into the business methods of the Hampton Court Gas Company, by the Directors and their Engineer and Manager (Mr. W. E. Price), of the free maintenance of incandescent and other burners, making only "the lowest possible charge" for the replacements, was the subject of a paragraph in last week's issue. In that reference to the matter, we asked for communications from other managers who may have tried the same scheme. The first response came from Mr. C. E. Botley. It appears, from a circular issued by the Hastings and St. Leonards Gas Company, that this particular system of maintenance has been the fashion with them for some few years past—in fact, Mr. Botley tells us, they have had no other system. The circular he has sent imparts to consumers some useful information; and the portions referring to maintenance are these: "In regard to the use and maintenance of incandescent burners of all kinds, the Gas Company will give every possible assistance to their consumers, doing renewals at out-of-pocket cost. . . . Incandescent burners may become somewhat inefficient after a

time, owing to dust, &c., which, however, can be generally readily removed; but in this matter the Gas Company are glad to be of assistance, also inspecting burners at their discretion gratis. Whenever a mantle is renewed, the burner should be properly cleaned; and after a burner has been in use some years, it may be advisable to remove it from the fitting altogether for thorough cleansing. The Gas Company cannot possibly be responsible for mantles, &c., left, either fixed or unfixed, in the consumer's possession; and it is therefore most desirable that consumers should see, when mantles are renewed, that they are left satisfactory. Every employee of the Company is forbidden to supply or fix a defective mantle under any circumstances. All 'C' burners recommended and supplied by the Gas Company are tested and numbered by them; and they are fixed with bye-passes and governors. The latter are very necessary, and add considerably to the life of mantles." In the "Correspondence" columns are letters referring to the same subject, from which it will be seen that Mr. Thomas Price, of the Walton-on-Thames and Weybridge Gas Company, has had the system of free attention to incandescent burners in use, with very satisfactory results, for some eighteen months past. Mr. Henry Tobey, of Malton, is proceeding on similar lines; the cleaning of consumers' burners being performed by the Company, entirely without charge.

Changes at Southampton.

Notwithstanding the fact that the working of the Southampton Gas Company for the last half of 1903 was of a most satisfactory character, the shareholders must have regarded with very mixed feelings the report which was submitted by the Directors at the meeting a few days since. The explanation of this is that, along with the increased prosperity of the undertaking, the Board had unfortunately to chronicle changes (which have, of course, mostly been recorded in the "JOURNAL") brought about by time and death. In the first place, there was the death of the late Chairman, Dr. T. W. Trend, who had been a member of the Board for many years, and had devoted himself to forwarding the interests of the Company. Next came the resignation, owing to advancing years, of Mr. J. B. Paddon, who had acted as Consulting Engineer to the Company for the long period of 38 years; and lastly, the retirement of Mr. C. Crowther Smith, who had been Secretary for nearly 39 years. The shareholders will derive some consolation from the knowledge that the services of the latter gentleman are not to be altogether lost to the Company, he having been elected to the seat on the Board rendered vacant by the death of Dr. Trend; while the new Secretary (Mr. E. W. H. Eady) is an old servant, and a worthy successor to Mr. Paddon as Consulting Engineer has been found in the person of Mr. Joseph Cash. Mr. Paddon and Mr. Crowther Smith are to be congratulated upon the satisfactory condition of the Company's affairs at the time of their retirement; and Mr. Cash and Mr. Eady upon the positions to which they have been appointed in so prosperous an undertaking. An increased sale of gas and a reduced price (even though it may apply to part only of the area of supply) are pleasant accompaniments both to the resignation of old officials and to the appointment of new ones.

Critical Councillors at Wigan.

In a paragraph under this heading, we last June commented on the action of a Wigan town councillor, who found fault with the decision of the Gas Committee to allow the Engineer to attend the meeting of the Institution of Gas Engineers. It had unfortunately to be pointed out that that was not the first occasion on which the Council had rendered themselves conspicuous in the manner referred to; but nevertheless a hope was expressed that it might be the last. The same old spirit, however, has shown itself again; one of the members this time having objected to the sending of a deputation to the annual meeting of the Association of Municipal Corporations. One reason he vouchsafed for this course was that the Association had proved of no use, because, instead of themselves taking up the question of compulsory running powers over corporation tramway systems, a special conference had to be called for the purpose. There was, however, another explanation, and this was that the meeting was to be held in London, "which was a sort of loadstone." A visit to London suggests nothing to the mind of this worthy Councillor except a "picnic." It might perhaps be possible to make use of the Metropolis for picnicing purposes; but we can assure this citizen of Wigan that a good deal of solid business is transacted within it as well. As to the first objection, does it not occur to him that the very best way to make the Association referred to (or any other) utterly useless is to object to sending representatives to attend the meetings? Fortunately, he failed to find anyone to second his attempt to prevent the Corporation appointing a deputation; but if he had carried his point, and other Municipalities had followed the example, where would the Association be? If the proceedings in the past have not had all the results that might have been expected—and we have only this Councillor's opinion for it—the surest remedy would be to increase the attendance at the meetings, not to lessen it. Would it not be possible to induce the gentleman in question to join the next deputation to London, in which case it may be taken for granted that he would have his mind disabused once and for all of the "picnic" notion? The time has now arrived when corporations will be considering the question of sending their engineers to the forthcoming meeting of the Institution of Gas Engineers; and we trust that every member will consider the matter from a higher standpoint than that just alluded to. Meetings of men engaged in similar work are bound to be mutually beneficial; and even at a "picnic" some useful "wrinkles" may be acquired.

Pearson Chalk Gas.

The application by Mr. Richard Pearson for a patent for "Improvements in the Method of, and Apparatus for, the Manufacture of Lime and Fuel Gas" was noticed in the "JOURNAL" for May 19, 1903; and in calling special attention to it, a few particulars regarding the proposal were reproduced from the columns of the "Sussex Daily News." These were, of course, not sufficient to allow of any definite opinion being passed upon the process; but in view of the statement made that both Professor C. Vernon Boys and Mr. W. J. A. Butterfield had pronounced the invention to be an unqualified success, we remarked that it would be interesting to hear further of the matter. In this, however, we were destined for a time to be disappointed, for no other details came to hand until the publication last week of the complete patent specification. Presumably, there is no reason now for withholding publication of full information regarding the invention; and we shall therefore hope shortly to be placed in possession of figures, &c., bearing upon the results which are anticipated from the working of the process—more especially in view of the fact that those previously given in the "JOURNAL" might possibly be open to exception on the ground that they were not "officially" communicated to us for publication. Meanwhile, we have, in another portion of to-day's issue, reproduced the patent specification practically speaking in its entirety, in order that readers may have an opportunity of ascertaining for themselves the method by which Mr. Pearson proposes to manufacture his lime and fuel gas.

The Jubilee of the Society of Engineers.

The completion of fifty years' existence of an organization, as of an individual, affords a good opportunity of reviewing the progress made in that long period. In the case of the former, it is interesting to consider what were the objects in view in founding it, and how far they have been achieved. It is fortunate when someone remains who can speak from personal knowledge of the events of the past, and thus form a connecting-link with those of the present. The members of the Society of Engineers were in this happy position at their Jubilee Meeting on Monday last week, when Mr. Perry F. Nursey, the Secretary and a Past-President, gave to them, in the form of a paper, a sketch of the history of the undertaking, the principal portions of which will be found in another part of the "JOURNAL." From a small social gathering of students of a college for the education of engineers—the object being "to recall old times, see old faces, and hear of the fortunes of old friends"—the Society of Engineers, with a present membership of 540, was evolved with a very much wider scope. The meeting-place was changed from a room at a tobacconist's in the Strand to the offices of Mr. Christie, one of the founders; and the formal reading and discussion of papers on engineering subjects was inaugurated. The first was by one who came to hold a conspicuous place in the gas world—the late Mr. Henry Palfrey Stephenson. The advent of Mr. Alfred Williams, in 1855, was a

valuable addition to the executive of the young Society; and his good administrative powers led to his appointment as Honorary Secretary and Treasurer—a position which he held till his death in 1894. It was due to his initiative that the instructive vacation visits of the members were organized in 1863. Two thousand years ago, the Roman poet contrasted, in classic language, the different effect upon the mind of what is heard and what is seen. He pointed out that the former, in homely phrase, often "goes in at one ear and out at the other;" while the latter is, so to speak, photographed upon the retina and long retained by the memory. Mr. Williams, probably quite unconsciously, emphasized Horace's dictum; and the feature of the Society's work which he introduced is not by any means the least valuable one. The visits are something more than mere "outings;" they possess educational value for all who take part in them. Mr. Nursey gives to Mr. Williams the greatest share of the credit for steering the Society safely through its troublous times; and as, according to Emerson, "an institution is the lengthened shadow of a man," he enjoins the members to so endeavour to promote its best interests that it may continue to be "not only the lengthened, but the ever-lengthening, shadow" of their respected departed "father."

Bright Streets for English Towns.

On several occasions of late years, the wish has been expressed in these columns that architects employed in the rebuilding of London, and also in improving the principal towns of the kingdom, would have more regard to the desirability of securing the highest attainable degree of brightness and cleanliness in new street frontages. We have repeatedly pointed out that the vastly superior brightness of Paris and Berlin to London is largely due to the circumstances that the former are white cities, whereas London is gratuitously black. The difference in light-reflecting value, whether by day or night, between white and terra-cotta surfaces is plain enough to all beholders; but, with few and rare exceptions, British town architecture took no heed of it. It is with very considerable gratification, therefore, that we are able to point to a realization, on the very largest scale, of our views on this matter of town building, in the new Savoy frontage, just completed, which has gone a very long way towards setting the example of how the historic Strand—the most notable thoroughfare in Europe—should be rebuilt as a street of modern palaces. For the whole of this splendid structure is faced with white glazed blocks, with majolica relief; and special provision is made for periodical washings of the surface. It will be interesting to see how the experiment answers, in the trying conditions of the London climate. The building in white is simple enough. Even Bath stone is white when it is new; and, of course, the old-fashioned painted "stucco" of the Regency period can always be repeated, as a last resource. So far as we know the Savoy Extension is the only considerable building in London which has been made bright and light reflecting, and is to be kept clean, deliberately, and with intention to rise superior to the atmospheric conditions. It will therefore be watched with some anxiety by those who know the potency of this atmosphere as regards reducing to one sad hue all objects exposed to the weather.

WATER AFFAIRS.

The Tenby Corporation in a Dilemma.

It will be seen by the report of the proceedings in the King's Bench Division on Wednesday, which will be found in another part of the "Journal," that the efforts of the Corporation of Tenby to provide the town with an adequate water supply have not only proved abortive, but have landed them in a dilemma. A scheme had been prepared, and the sanction of the Local Government Board to the raising of £16,000 to carry it out was duly applied for. But it did not receive the approval of the officials at Whitehall, and consequently the loan was never granted. The Board, however, expressed their willingness to entertain an application for authority to raise money for obtaining a supply from another source. This the Corporation set themselves to find; and in so doing incurred expenses amounting to £600. At the end of the financial year 1902-3, certain of the sums paid stood in the books of the Treasurer as an overdrawn account. With the intention of obtaining the sanction of the Local Government Board to the expenditure, the Corporation asked the Treasurer for the time being to allow the £600 to be carried to a suspense account, pending its inclusion in an application for a loan; but he refused to do so. Thereupon the Corporation arranged with Lloyds Bank to pay him off; and an order was drawn upon his successor to do this. Application was then made to the High Court for a writ of *certiorari* to quash the order, on the ground that its execution would create an illegal overdraft; and a rule was granted. Mr. Macmorran, who appeared, on behalf of the Corporation, to show cause against the rule, explained that the Court had been applied to under section 246 of the Public Health Act, 1875, which provides that the accounts of a borough are to be examined by Auditors elected in accordance with the Municipal Corporations Act. In the present case, the expenses incurred did not come out of the borough fund but out of the general district rate, which had to bear the cost of providing a water supply. He acknowledged that it was in the discretion of the Court to say whether or not the order should be quashed; but, as there had been no misapplication of money, he submitted that it should be allowed to stand. In the event of the loan being refused, the payments made would, of course, become illegal; and then would be the time to raise objection to them. The Lord Chief Justice asked what would be the effect of quashing the order. Mr. Danckwerts, who represented the Crown, replied that the Corporation would owe the bankers so much money, for which they would have to wait till the Local Government Board sanctioned the loan. The Lord Chief Justice, after reviewing the circumstances, came to the conclusion that the rule must be made absolute. He said the action of the Corporation amounted, in effect, to borrowing money to pay off certain expenses, instead of including them in their annual estimates. Such an arrangement ought not to be allowed to stand. The Corporation must get out of the difficulty in the best way they could, without relying upon the order in question. Justices Wills and Kennedy, who heard the arguments with Lord Alverstone, concurred in his decision. The case will serve as a caution to local authorities placed in like circumstances.

Water for Fire Extinction.

An interesting case, involving the right of a Water Company to charge for water used for extinguishing fire, was recently decided by the learned Judges named in the preceding paragraph, as reported in the "Journal" last week. A certain Co-operative Society had been provided by the Weardale and Consett Water Company with a fire-plug for the supply of a cattle-trough, and water obtained therefrom had been used for extinguishing a fire which had broken out in a haystack upon the premises. The Company sent in a claim for the water; but payment was disputed on the ground that by section 42 of the Water-Works Clauses Act the Company have to keep all fire-plugs fully charged with water, and allow its free use in the event of an outbreak of fire. The Company summoned the Society for the amount; but their claim was dismissed, on the ground that, under the section cited, the parties were entitled to a gratuitous use of the water. The Company appealed to the High Court, and were successful in sustaining their claim. It was submitted to their Lordships that the Act of Parliament did not confer upon private persons who might happen to have a fire-plug fixed on their premises, the right to use water for fire extinction without paying for it. It was contended on behalf of the respondents that it was immaterial where the water was obtained from for this particular purpose—it might even be from the tap in a bath. The Lord Chief Justice pointed out that this was equivalent to saying that water used for putting out fires should always be supplied free. But, in order to put such an obligation upon a company trading under parliamentary authority, it must be expressly stated. This had not been done by the Legislature in the Act named; and therefore the appeal must be allowed. The other learned Judges concurred. It should not be concluded, therefore, that because a water company, for the convenience of a consumer, fix a fire plug on his premises for the purposes of his business, he is to be entitled to take a free supply of water therefrom for fire extinction. In such conditions, the fire-plug is, in the eye of the law, merely a kind of enlarged tap, water from which must be paid for.

THE VALUATION BILL.

THE Government Valuation Bill, the introduction of which was briefly mentioned in the "JOURNAL" last week, has already been considered by many local authorities, and it is very desirable that the purpose and scope of so important an alteration of the administrative procedure of England and Wales should be thoroughly grasped by ratepayers, especially those whose relations with the rating authorities are of a particular kind. It is, moreover, well understood that the proposed amendment of the process of valuation is preparatory for the reform of the whole system of raising local revenue to which the Government are pledged. To begin with, the present Bill makes a sweeping change in the constitution of the valuation authorities; the existing Assessment Committees being abolished, and their duties transferred to the councils of counties and county boroughs. Among these duties is to be included the supervision of the valuation lists, as prepared by the Overseers. The constitution of the new valuation authorities is one of the most important features of the Bill. Where this authority are the County Council, they may treat their county as a single unit; or, which will be more general, the counties will be divided into valuation districts on the basis of a population of 50,000. If any non-county borough or urban district has such a population, it will be a separate valuation district, unless its own Council agree to the contrary. In applying the plan to London, every Metropolitan Borough will be a separate valuation district. Every valuation authority throughout the kingdom will have to form a Valuation Committee for its district. These bodies will be the new Assessment Committees; but it is desirable that the new name of Valuation Committee, given to them by the Bill, should be used, because their composition will be so different from the old authorities that the distinction of style should be made. The Valuation Committee, then, will consist of district or union representatives, and of such other members, whether members of the Council or not, as the authority may appoint, subject to certain provisions as to majorities. In the case of London, the composition of the Committees will be different. At least a majority of the Committee must be members of the Borough Council appointed by the Council; and the remaining members are to be appointed by the London County Council. It is contemplated that the Borough Councils shall act as Overseers. This method of constituting the London Valuation Committees does not, it may be noted, command the unanimous approval of the Metropolitan Local Authorities, and they will most probably endeavour to get it altered.

During the year ending March 31, 1906, and in every subsequent quinquennium, the valuation authorities must cause new valuation lists to be made for every parish in their area. The valuation list in force will have effect for the purpose of every rate, and for the purposes of the income-tax and inhabited house duty. Directions are given as to what is to be included in the list; and the amounts of the various deductions from the gross value allowable for ascertaining the rateable value of hereditaments are stated in a schedule, which is the same as that enacted by the Valuation (Metropolis) Act, 1869. This provision will, at a blow, make a considerable change in many local practices, in the sense of a levelling-up of rating. The procedure relating to the preparation of new valuation lists is as follows: Before the 1st of May, the Overseers must make out a draft list, which is to be transmitted to the valuation authority for the district. A copy of this draft is to be furnished to the Surveyor of Taxes for the parish, who will insert his own gross valuations where these differ from the amount inserted by the Overseers, and also transmit his copy to the valuation authority before the 1st of July. In case of difference, the Surveyor's valuation is to prevail—notice being given to the occupier of the hereditament. The draft valuation list is to be revised before the 1st of October, and all objectors will have a right to be heard by the Committee. The draft valuation list is to be finally approved and sent to the authority before the 1st of November; and the list is to be deposited and be open for inspection before the 20th. Lastly, the totals of all the assessments are to be printed by the 1st of December, and copies are to be saleable to anyone at 1d. each. Provision is made for the preparation of supplemental and provisional lists. Appeals will still be to Quarter Sessions. Paid valuers may be appointed to deal with special hereditaments, instead of the Overseers, or the Valuer may be the assessor to the Committee. The remainder of the Bill is devoted to the machinery of the procedure.

It is premature to criticize the measure in any detail; but already, besides the Metropolitan Local Authorities that have been referred to, certain organizations of large ratepayers seem to have taken alarm at the proposal to make municipalities their own assessors. The Machinery Users' Association, for example, have pointed out that county and local authorities should in many cases be the largest ratepayers in their districts; which they are not likely to be under an Act which enables them to assess their own and other undertakings with which they compete as traders. Exception is also taken to the lack of an independent appeal authority, short of Quarter Sessions; and it is pointed out that experience of the working of the Valuation (Metropolis) Act, which is the model for the Bill, does not encourage the hope that the extension of the same conditions to the whole country will be workable. The chief justification for the measure is the proved neglect of the lists by Assessment Committees in some country places; but it is objected that relief from this misconduct might be procurable at less cost than that of the revolutionary proposals of the Government. However this may be, it is probable that the drastic charges provided for by the Bill will arouse a considerable amount of controversy, in which the case of the trading municipalities will come to the front. The lack of any effectual means of compelling such bodies to act fairly in respect to the assessment of their own property—with the exception, perhaps, of the control, such as it is, reposed in the Surveyor of Taxes—appears to be the greatest blot upon the Bill as drafted. This control, indeed, does not appear to be very effective as actually exercised under the Valuation (Metropolis) Act, if one may judge from the accounts of the municipalized London electricity-supply undertakings. Doubtless the attention of the Local Government Board will be given to this point. We should be glad to hear, from any readers of the "JOURNAL" who have given their attention to the subject, how they think the scheme of legislation now in question would supply those deficiencies of the existing law which have come under their notice. It seems a pity, for one thing, that the meetings for hearing objections are to be held after the 30th of June and before the 1st of October; that is to say, during the holiday season. Most professional men and lawyers are scattered to the four winds during these months, or for at least half of them; and it would be difficult to get much fresh public business done at such a time, without giving everybody concerned the greatest possible amount of trouble and inconvenience. It is scarcely reasonable, either, to expect unpaid members of public authorities to sacrifice their holidays for any such purpose.

A GAS COMPANY AND LOCAL IRONMONGERS.

So much has been written and said on the question of the relations of ironmongers and gas suppliers that has not been altogether favourable or acceptable to the former, that, happening on a case (through some local exhibitions) where the tradesmen and the gas suppliers work on a scheme which is found to be mutually advantageous, it is not by any means an unpleasant duty to call attention to it. This reciprocal arrangement, it is understood, has been on trial now for nearly twelve months; and the agreement is between the Hornsey Gas Company of the one part and seven or eight ironmongers of the other. It appears that the Company do not lend stoves on hire, and have not done so now for some ten years. Previously, however, they used to lend them. But they came to the conclusion that the system was too expensive; and so went in only for the sale of them on the hire-purchase principle or else at a long discount for cash.

What the Company have done now is to appoint the local ironmongers as their agents; and for show purposes, they supply these tradesmen with an agreed number of specimens of stoves of any maker they may chose—the stoves, of course, remaining the property of the Company. They also furnish them with catalogues and price lists of all the leading makers for distribution. In other words, each ironmonger's shop forms a show-room for gas-stoves; and they obtain stove customers for the Company on commission. All that the ironmongers have to do is to get the customer, send to the Company the name and address of the person agreeing to purchase, and the date. Then, if a sale results, the commission is paid; being calculated on the net cost of the stoves for which orders have been received. If a customer does not approve of the make or makes of stove exhibited by the ironmonger, he refers him to the gas-works, where there is a good show of all makes; and if a sale then takes place, it is placed to the credit of the tradesman. There is a simple form of agreement between the parties, containing certain clear and reasonable conditions respecting the ownership of the stoves exhibited, notice determining the agreement, and so on.

It may, we believe, be said that the Company are well satisfied with their experience of the work of the agents. Indeed, so far as can be seen, the scheme is likely to go on successfully, with profit to both sides. The area of the Company is comparatively a small one, containing between 9000 and 10,000 consumers; yet they are *selling* (by hire-purchase or for cash with a good discount) above 800 stoves a year. They feel they have made friends of men who might have devoted their energies and opportunities to cultivating, in preference to gas appliances, the sale of electrical or oil appliances; and they drop a good word for the Company whenever possible. A conversation with two or three of these tradesmen, together with their actions, convinces one that they regard themselves not only as the agents of the Company *de facto* but *de jure*, in view of the nature of their business. They cannot conceive why the relations of ironmongers and gas suppliers should be antagonistic, as they are in some places. The businesses of gas supply and of the retailing of the goods required for the consumption of gas are such that the one must be, if properly conducted, helpful to the other. They realize that their authorized agency for the Gas Company expands their opportunities for doing business, and that the more they can do, the better for themselves and for the Company—not in stoves alone, but in other appliances. Their shops provide (as it were) show-rooms, instead of in a single place, all over the district—in Hornsey, Crouch End, and Muswell Hill—which is another advantage to the Gas Company.

The mutual arrangement does not end as between the Company on the one part and the ironmongers on the other, but the latter work hand-in-hand for their mutual benefit. We have before us as we write a displayed circular received from one of them, which has been widely distributed in the district, and which informs the reader that—

The under-mentioned gas engineers of Hornsey having reason to believe that the management of incandescent burners and the renewal of mantles are matters of inconvenience, and often of unnecessary cost to their customers, are prepared to undertake the renewal of mantles and glass chimneys, also the cleaning of burners, at a quarterly charge of 9d. per burner for twelve burners and over, 1s. per burner where six or more are used, and 1s. 3d. per burner where a less number are used. Burners in outside lamps are maintained at 1s. 3d. each. This price applies to all "C" pattern and Kern burners up to size No. 4. The public are also reminded that if they desire a good light at small cost, there is nothing to compare with incandescent gas-light.

Particular attention is called to the fact that only experienced gas-fitters are sent out by those whose names appear at the foot of this notice; thereby ensuring customers skilled workmanship, with consequently the best results, both in good light and economy in gas consumption.

[The names and addresses of seven of the ironmongers follow.]

This shows that the ironmongers are keenly alive to the advantages of interesting themselves in the maintenance business. On the other side of the circular is some useful information for consumers regarding the incandescent gas-light; and the low prices at which the ironmongers are prepared to supply incandescent burners of various kinds. Among the information given by these persevering agents of the Gas Company, the following is found:—

From the booklet issued by the Hornsey District Council in 1902, we find (on p. 15) that the energy required to light 33 lamps of 8-candle power for one hour is one unit; and, therefore, for 1500 hours at the low rate of 4½d. per unit (as mentioned on p. 11), the cost will be £28 2s. 6d. Five No. 3 Kern burners, giving a larger amount of light, burning for the same number of hours with gas at 2s. 11d. per 1000 cubic feet, will cost £3 5s. 7½d. Or, again, burning 20 16-candle power electric lamps and 15 8-candle power lamps for 1500 hours at the same rate will be £46 17s. 6d.; whilst to burn seven Kern burners of equal candle power for the same time will cost £4 1s. 10½d.

With all of these matters, we became acquainted last week through another piece of enterprise on the part of the agents, acting in conjunction with the Gas Company. They combined in holding for six days three exhibitions—at the National Hall, Hornsey, the Assembly Rooms, Crouch End, and at Muswell Hill. No less than 25,000 circulars announcing the exhibitions were distributed, each being accompanied by a neat little "season ticket." Some of these were sent out by post; but the bulk of them were delivered by arrangement with the Church Army. The annoucements were signed by seven ironmongers, who were responsible for the exhibitions as follows: At Hornsey, Mr. J. B. Brooks, Mr. H. J. Honour, and Mr. A. Pratt. At Crouch End, Messrs. J. G. Dunn and Son and Messrs. H. E. Hill and Co. At Muswell Hill, Messrs. J. W. Carpenter, Limited, and Mr. J. A. Ritchie. Such a matter of interest as a number of local tradesmen going to this length in the exploitation of the gas appliance business induced a visit to the Hornsey exhibition, which (the information was given) was representative of the other two. There were seen the gas stoves and ranges of some dozen different makers which can be had by consumers on the hire-purchase system, or at cheap rates for cash. On tastefully draped stands were many of the lastest novelties for domestic labour saving as effected by gas, and decorative lighting arrangements; while ranged in double line down the centre of the hall were types of lamps and fittings of high-power, ordinary, and inverted forms. Exhibitions of laundry work were also being given; and lectures and demonstrations on cooking by gas were a great attraction twice each day—all of these being in well qualified and skilful hands. Miss Edith M. Lewis was entrusted with the work at Hornsey, Miss M. G. Baker, at Muswell Hill, and Mrs. M. A. M'Nair and Mrs. Chamberlain at Crouch End. Each afternoon, the ladies attending were invited to take tea—of course, free of charge. From Mr. J. B. Brooks, the first agent mentioned, who was the Chairman of the Exhibition Committee, we learned, with pleasure, that from the exhibitions the agents were obtaining "good results, in the shape of orders in the heating, lighting, and cooking branches."

Such enterprise as this is worth special notice and merits success. If the ironmongers throughout the country had shown similar activity, the gas stove and fitting business (which has grown so enormously of late years) would not have slipped so largely from their grasp in the manner it has done. For this, they must blame their own inertness; and they may now look with envious eyes on their more fortunate fellow-tradesmen in Hornsey. Perhaps, however, the experience recorded here may do something to energize the ironmongers of other places.

An Electricity Company's Contract for Coal Gas for Power.—The Northern Counties Electricity Supply Company are putting down plant for the supply of Malton, and have contracted with the Gas Company for gas for the engines to run their plant, for a term of ten years, at 2s. per 1000 cubic feet—the ordinary price being 2s. 10d. Congratulations alike to the Gas Company and Mr. Henry Tobey on the enterprise which has secured them this contract.

MR. G. ANDERSON AND THE GAS INDUSTRY.

It would not ordinarily occur to a student of the technical history of the gas industry, who should require to clear up some hazy matter of the brave days when Colonel Croll was the principal figure therein, to look for it in a small paper-covered book bearing the title by which Mr. George Anderson has chosen to introduce to a younger generation his version of "Gas Making Fifty Years Ago."* The latter is really the title of the main division of Mr. Anderson's little autobiography; and seeing that the interest of the story, whether it relates to the veteran gas engineer himself or to those with whom he had dealings during the busiest portion of his career, is strictly of gas, "gassy," it might be complained that Mr. Anderson has thrown off the scent those who would be his most sympathetic readers, by the name he has chosen for the book itself. In point of fact, there is more about gas manufacture and the enterprise of gas supply in this extraordinarily named pamphlet than can be found in any autobiographical writing that has seen the light of publicity for many years. Therefore, whatever may be the strength of Mr. Anderson's claim to be a Rationalist in the sense which is usually conveyed by writing the word with a capital letter, many will think that there is more than a touch of illogicality in his putting forward a string of technical and financial reminiscences under a title which is really a disguise. But this confusion of title being disentangled, it remains to explain, for the benefit of our gas engineering readers, to whom the name of George Anderson has always been a household word, what he himself regards as most memorable in his long and prosperous career in the profession.

So far as lies on the surface of his story, Mr. Anderson found his career only begun by his fortunate introduction to Colonel Croll, as he almost invariably styles his old chief. Before this epoch-making meeting, nothing seems to have happened to Mr. Anderson that he deems worth recording. Unfortunately, the date of this event is not given. We are only told that Colonel Croll was busy at Tottenham, and also making arrangements to light the city of Leyden with gas, when he found the assistant after his own heart who was fated to labour with him in many great and notable enterprises of the same nature, and to sing his praises long afterwards. For the reverence which Mr. Anderson has always paid to Croll, and the iteration with which he has repeated Croll's triumphs in the ears of a generation that hardly knew that masterful personality, are remarkable. Croll started the Tottenham Gas-Works, and appointed Mr. Anderson to be the first Manager thereof, in virtue of the manifestation by the latter of a readiness of resource and presence of mind which were then, as now, commodities of value in the gas business. The Tottenham works were soon after sold to a local Company on a 6 per cent. capitalization of the annual profits—a scheme which Colonel Croll and his henchman conducted with great advantage. The Tottenham and Leyden jobs preluded larger ventures, which the ambitious Croll prepared while carrying on his meter factory in Clerkenwell. The distinction between gas engineers and traders was not drawn in those days. The context, however, shows that the time was long ago; though Mr. Anderson is shy of mentioning dates.

The upshot of the conferences and calculations narrated by the survivor of those ancient days was the promotion of the Great Central Gas Company, to supply the City of London with gas at the level price of 4s. per 1000 cubic feet, instead of the 6s. per 1000 cubic feet which the established Companies were charging. Mr. Croll backed this big speculation with the whole of his private resources, which had recently been strengthened by the Tottenham deal, and the disposal of the lease he held of the Coventry works. Naturally, Mr. Anderson, who had had all the drawings and quantities for the work through his own hands, makes much of the novelties of design they exhibited—such as the untrussed gasholders, with tripod guide-framing. However, it does not appear that these engineering details had anything to do with the fate of the scheme, which was rejected by the Committee on the Bill without calling evidence on the other side. Such a rebuff would have disheartened most speculators; for there were no Syndicates in those days, and limitation of liability outside a Special Act was not invented. But Croll was no ordinary man, and he was associated with the City Solicitor, Mr. Charles Pearson, also a man of conspicuous ability and with much of the "wisdom of the serpent" in him. It was decided to go on without an Act of Parliament; Mr. Pearson having the ingenious idea of binding everybody having dealings with the Company not to look beyond them for payment. Croll contracted with the Company to manufacture the gas and deliver it into the holders for 1s. 4½d. per 1000 cubic feet; thus leaving the Company themselves 2s. 7½d. per 1000 cubic feet for distribution, office expenses, and dividend. The City was canvassed for consumers, and 4900 citizens were obtained who bound themselves to take the gas for five years. The construction of the works, on a site at Bow Common, was an engineering triumph. By the terms of the consumers' contracts, the supply had to be given by the 29th of September of the year following the defeat of the Bill; and the works, begun in March, were making gas by Michaelmas, 1850. This is the first date given by Mr. Anderson. It was something

* "Some Chapters in a Rationalist's Life." Recorded by Himself. London: Watts and Co.; 1904.

to be proud of; for, in addition to the building of the works, including the 100-feet holders in brick tanks, three miles of 26-inch trunk mains had to be laid to the City, besides about 70 miles of distributing pipe of all sizes. Of course, there were many defects; but the situation was saved, and not a single accident marred the success of the opening. "The manufacture and supply of gas of good quality was carried on uninterruptedly from the first; and we had no apologies to make to the public that our gas contained either ammonia or sulphur, for both those impurities were extracted by the use of chloride of manganese and lime." So says Mr. Anderson, whose position at the works was that of Resident Engineer and Agent for Mr. Croll and the Company. Mr. David Methven was the first Manager of the works. Under him, Mr. Anderson believes the manufacture of gas was cheaper than it is now. He declares that the larger consumption, not technical improvements, is the reason for the greater cheapness of gas to the consumer of the present day.

Croll and Anderson were, of course, the heroes of the hour that witnessed the supply of gas to the City of London at 4s. per 1000 cubic feet; and emulation duly followed. There is a good story, too long to repeat here, of how the dauntless Scots—for all through it was a case of the Scots having "come to London"—stormed the Rotherhithe works of the Surrey Consumers' Gas Company, whose Manager could not keep the holder up himself, and was averse to strangers being called in to do it for him. Those were days when the difference between the "tariff companies," as the older undertakings might be called, and the representatives of the new blood in the London gas business, was worth fighting for. The public wanted 4s. gas, and meant to have it. Gas was gas, also, in those days. Good, honest, unadulterated, and undiluted, with nobody to worry the manufacturers over microscopic tests of meaningless characteristics, of no earthly value to anybody except the officials who live by them! Mr. Anderson was so deeply immersed in the details of the great enterprise, that he perhaps failed to perceive what it really was that his Chief was building up, without knowing it himself. The result of Croll's many enterprises, however, was no other than the British gas industry as we have it to-day—a gas supply system which responds more quickly and completely to the fluctuations of the markets than any other. The rigidity of the old London Companies might have landed the country in the same condition as regards gas finance as that which prevails in Paris, where the price of gas to the private consumer was fixed for nearly fifty years by agreement between the Company and the Municipality, who divided the greater profits derived from the increase of the business. Croll secured the trade for private enterprise; and as the public authorities were able to know from time to time all about the profits, it was comparatively easy to keep these within reasonable limits. Croll's success was based on competition; but it did not carry the method farther than was useful and prudent.

There is much in Mr. Anderson's memoir about his dealings with the Dover Gas Company, the Cork gas supply, the Waterford Gas Company, and his Continental ventures; but he does not bring his gas record beyond the period when there were fat leases of gas-works to be had by those who knew their trade and had the courage of their opinions. So far as it goes, this story of Mr. Anderson's engineering life is both instructive and inspiring, and one is glad to have it at first hand, though it does come in such a strange shape.

ELECTRIC LIGHTING MEMORANDA.

The Supply of Electricity Bill—Original Features of the Measure—A "Willesden Clause" for Ilford—A Tramways Company and Public Lighting—Economics of Electricity-in-Bulk Generation.

THE Government Bill to amend the Acts relating to electric lighting was introduced in the House of Lords last week by Lord Wolverton, and its provisions are sure to be closely scanned by local authorities and companies in this line of business. Its purposes are manifold, and may be classified in general terms as seeking to adjust the law of electricity supply to the proved requirements of the industry, as developed during the past few years. In the first place, it is proposed that the Board of Trade shall be authorized to include in Electric Lighting Orders permission for the undertakers to acquire compulsorily, for their generating station, any land specified in the Order, whether situated within or beyond the area of supply, and, in the case of a local authority, whether situated within or beyond their district. For this purpose, the provisions of the Lands Clauses Act relating to the purchase and taking of lands otherwise than by agreement are incorporated in the Electric Lighting Acts; and such proposals are to be advertised. Further, for the purpose of enabling electricity to be brought into an area of supply from an outside generating station, the Provisional Order may authorize the breaking up of any road, railway, or tramway. Arrangements will also be sanctioned in the same way for dealings in electricity in bulk, including the making of such supplies compulsory. The right of purchase conferred on local authorities by the Act of 1888 may be modified so as to exclude bulk supplies, and to facilitate joint undertakings. Probably, however, one of the clauses of the Bill to which local authorities will take exception is that which dispenses with the consent of the local authority as regards the granting of an Order. The views of the authority are to be considered; but the grant of the Order will be at the discretion of the Board of Trade.

For both companies and local authorities dealing in electricity, a very important clause is one that relates to making five instead of seven years the ordinary period for revising the maximum price, and allowing representations as to revision to be made by such number of consumers, not less than 20, as the Board of Trade consider sufficient, having regard to the population of the area of supply. This provision is to apply to any Act or Provisional Order passed or confirmed before the commencement of the Act. Another clause, which is only to apply to subsequent Orders, relates to the certification of consumers' meters before fixing. As regards Acts or Orders in force, it is proposed that so much of them as requires a meter to have been fixed before being certified shall be abrogated; but every duly certified meter must be fixed and connected with the services in some manner approved by the Board of Trade. Persons are not to be entitled to demand from undertakers a supply of electricity for premises having a separate supply, unless they have agreed to pay a reasonable return on the capital expenditure. Where any local authority authorized to supply electricity have entered in a contract with a company or person for such supply, the Board of Trade may, if they think fit, exempt that company or person from any provisions contained in the Order which may appear to prevent the performance of the contract. The Bill is practically the same as the measure introduced last session, which did not proceed far as time was too short. It appears to command the support of the private trade; though how the municipalities regard it has not transpired.

Success has attended the efforts of the Ilford Gas Company to obtain the insertion of the Bermondsey clause, or something like it, in the Ilford Urban District Council Bill. This was done by the House of Lords Committee of which Lord Clifford of Chudleigh is Chairman, on the statement of Mr. Baggallay, K.C. Counsel took a very fair line—admitting that the question of principle involved in the Bermondsey clause had been raised many times, and that Parliament had given decisions in both ways. The case in point was rather an acute one, as the Council were asking for leave to borrow £10,000 for the purpose of supplying consumers' electric fittings on the hire-purchase system, and the Gas Company greatly object to pay as ratepayers for this form of municipal trading competition. Of course, electric lighting companies do it everywhere, and gas companies do not object; but it seems impossible to persuade local authorities that the possibility of the proceeding being subsidized out of the rates which gas companies pay, makes all the difference. In the course of the discussion in Committee, the financial circumstances of the Ilford electricity supply undertaking came up for criticism, and it was argued that if the accounts had been kept in a proper manner the business would have shown a loss instead of the small profit claimed for it. Notwithstanding the objection of the Council, the Committee decided to insert a clause on the lines of the Willesden modification of the Bermondsey precedent, which, however, the promoters mean to try to get struck out in the Second House.

A rather important precedent seems to have slipped into this year's Bill of the London United Tramways Company, who are seeking (among other objects) powers to extend their system through certain rural districts in Middlesex. It has been well said that one of the best definitions of the "country," as distinguished from the "town," is that the former is the region which lies beyond the public lights. If the tramways go outside the public lighting districts of Middlesex, the County Council hold that it should be required of the Company to light the track, especially at the cross roads. The difficulty hereupon arises that the Tramways Company are not a lighting authority, and are prevented by Parliament from becoming so. It is admitted, however, that, as a matter of fact and for their own convenience, the Company do fix lamps to some of their trolley-wire standards. What the Middlesex County Council sought was to make this lighting of the track obligatory where there are no other means of doing it. The Committee acceded to the request; and accordingly the Tramways Company are to provide lighting at the cross and lateral roads to the order and satisfaction of the County Council. This is probably a unique case, because few electric tramways in this country as yet run outside the limits of the ordinary street lighting; but if the present tendency to treat some lines of electric traction as light railways, connecting with town tramways, develops to any considerable extent, the argument for giving some lighting powers to the owners will be considerably strengthened as regards rural districts.

Those who are curious as to the economics of electricity-in-bulk generation ought soon to be in possession of authentic information on the subject, if one may judge from the willingness of electrical engineers to publish all they know about it. A good paper on "Power Station Design" has just been read before the Institution of Electrical Engineers, the authors being Messrs. C. H. Merz and W. M'Lellan, from which it appears that the engineering problems of this enterprise have all been solved. There are, it may be premised, several orders of power stations which generate and supply electricity in bulk. One of them is the kind of establishment which the older Metropolitan Electric Lighting Companies have found it is expedient to arrange for,

singly or conjointly, so as to supplement or to take the place of the original central stations. Such a power station is that of the Central Electric Supply Company, on the Regent's Canal, in the north of Marylebone, which is intended to supply the increase of the Westminster and Pall Mall Companies. In such a works, the character of the plant and the system of working have reference to the circumstance that the nature of the load is precisely the same as that of the older electric lighting stations; so that any possible advantage from the generation in bulk must proceed from the scale of the plant and the character of the engineering. On the other hand, those electricity-in-bulk schemes which aim at doing a general business in distributed power over a large area depend, in addition, upon the "diversity factor" to furnish them with a better average load than any mere lighting station can hope for. The difference influences the selection of the plant. Messrs. Merz and M'Lellan are worth reading on this head. Their paper is published in the electrical journals. They strongly confirm what others have said before them, as quoted in this column last week, on the disadvantage of electric lighting and power combinations. And to think how many disappointed local authorities are trusting to such combinations to help their electricity-supply finances! The truth is that electricity for lighting purposes, like gas intended for the same use, is a special product, in which quality, however measured, has to be obtained at all costs. If mere power is required, it appears that, with electricity as with gas, a very much cheaper order of product will answer the purpose. The authors of the paper in question say unhesitatingly that "if a station for power supply were designed on similar lines to many existing power stations for traction and lighting purposes, commercial failure would almost certainly result." And yet the owners of such condemned stations commonly offer supplies of power at lower prices than any power company can afford to sell it for, and live. The inference is plain; but, in the meantime, unfortunately, the outrage on sound commercial principles goes on. It is difficult to speak too highly of Messrs. Merz and M'Lellan's paper, which covers the whole ground in a masterly manner.

A BITTER PILL FOR MUNICIPALITIES.

THOUGH they made a wry face over it, the Plymouth Corporation decided last week to swallow "the bitter pill," as one of the members called it, of Local Government Board audit of the municipal accounts. One-third of the members present at the meeting at which the decision was taken had the courage to vote against the proposal, while a majority of those who assented to it explained that they did so because they saw no other way out of the difficulty. There was a good deal of recrimination—each party in the Council being anxious to fasten on the other the responsibility for the indignity placed upon the town. Some of the speeches were pitched in a key of almost comic pathos. Plymouth sets up a claim to be one of the oldest of municipal boroughs; and the members of the Corporation bemoaned the loss of the liberties which the town has enjoyed for 500 years, as well as the fact that it will have less liberty than many much smaller towns. The idea that a Government official might put his finger on this or that item of expenditure and say that the Council were doing things for which they had no authority was particularly distasteful. He might even say that the cost of the fishing feast is not a legal charge upon the rates, or that the Corporation should not pension their workmen, and put the amount down in the accounts as special allowance for sickness. There were other things equally unpleasant to the majority of the members in the idea of interference by the representative of a Government Department; and one of them lamented sadly this "greatest insult and the greatest curtailment of the rights and privileges of the ancient borough." The Chairman of the Finance Committee made a strong point of the fact that the Council had for centuries been trusted by the people who had elected them; but when he went on to claim that those who are now on the Council are perfectly competent to govern the town, he laid himself open to the retort that Parliament clearly does not think so.

It may after all turn out that the Local Government Board audit is neither so terrible nor so incompetent a thing as members of the Corporation try to make out. It is probably true that no system of audit can prevent reckless capital expenditure. So long as borrowing is easy, and payment can be left to someone else, there will always be found men in public offices prepared to spend money freely. Whether the objects on which it is spent are wise or foolish is a matter with which the Auditor will have no concern. It will be sufficient for him to know that the expenditure is legal, and that the money has been raised in a legitimate way and applied to the purpose for which it was borrowed. But though the Auditor will not be able to control the policy of the Municipality, his presence will exercise a wholesome restraint where it seems most to be needed. He will prevent the Council piling up suspense accounts, and spending money in advance of legal sanction. There will be no Corporation overdraft at the bank, no paying of interest out of capital during the construction of municipal works, and no shirking of financial responsibilities in order to prevent an immediate increase in the rates. In all these respects, the Corporation will feel the effect of the Auditor's presence, and many irregularities will be checked. If it is true, as the Chairman of the Finance Committee asserts, that in the management of their finances the Plymouth Corporation have been "doing exactly as other corporations are doing," there would seem to be good reason for giving very much wider application to the Local Government audit. This appears to have been realized at Plymouth, for some of the gentlemen more immediately identified with the Progressive policy which has landed the town in its present difficulties, spoke of the action of the Local Government Board as a manifestation of "the anti-municipal spirit" which they declared is abroad at present, and predicted that the restrictions placed upon Plymouth would in time be also imposed on other corporations. The feeling that the town is being made an example of, and that the Corporation were standing in the breach as the protectors of the rights and liberties of municipalities against a tyrannical bureaucracy, added bitterness to the sense of defeat. It was in vain that they were reminded that their liberties are now limited in many directions, and that municipal freedom is hedged round by parliamentary restrictions of many kinds. All this was admitted to be true; but it did not make the prospect of the new control any more pleasant. Parliament has chastised the municipalities with whips; but the Local Government Board, it is feared, is going to chastise them with scorpions. In other words, the Board will compel the Corporation to obey the law which Parliament has made.

THE GAS AND WATER STOCK MARKET.

(For Stock and Share List, see p. 395.)

ANOTHER buoyant week is the Stock Exchange record. It opened on Tuesday a little shy, but quickly recovered, and all prices rose freely. The inevitable realizations to secure profits soon showed themselves from time to time after each advance; but so strong was the upward tendency, that it promptly re-established itself after each check, and it was particularly evident among the solid investment class of securities. A great aid to the movement was found in the Money Market, where an over-abundant supply had difficulty in finding employment. Discount rates eased persistently throughout the week, and closing rates were very light. Business in the Gas Market was to the full as active as it was in the preceding week; and it was fairly well distributed among undertakings in all parts and of all sorts, though the lion's share went to the big issues. The tendency was very favourable; and the upward movement in quotations, which had previously been somewhat restricted, extended to issues hitherto unaffected by the general buoyancy. Thus an unusually large number of improvements took place. In Gaslight and Coke issues there was great activity; the ordinary changing hands freely every day at very steady figures. The opening figure on Tuesday was 95; and the best price of the week was 96⅛, which was marked more than once. The secured issues were moderately busy, and were firm; the preference advancing a point. South Metropolitan was unusually brisk, changing hands daily at steady prices; and the debenture, too, was in request. A fair amount was marked in Commercials at improving figures. The stock recently offered by the Company for subscription, at a price which some few critics said was too high, was largely over-subscribed. Business in the Suburban and Provincial group was quiet; but a very large number of undertakings advanced their quotations, the particulars of which are noted in our list. The Continental Companies did a limited business; but the tendency was capital, and prices advanced in Union and Imperial. Of the remoter undertakings, several participated in the general rise; but River Plate, which had been moving too fast, had a little set-back. There was a moderate array of transactions in Water, mostly at unchanged figures; but there was a very slight upward movement in the debenture stocks of most undertakings.

The daily operations were: Gas opened strong and active on Tuesday (after the Monday closure), and prices were good; but the only change was a rise of 1 in Imperial. Wednesday was a lively day, with a general upward move. Brighton original rose 7, ditto ordinary 5, Crystal Palace 2, ditto preference 5, ditto debenture 1, Brentford old 3, ditto new 2; Buenos Ayres debenture, both Unions, Oriental, both Tottenhams, and West Ham, 2 each; all Commercials, Gaslight preference, Imperial, Lea Bridge, and River Plate debenture, 1 each; and British ½. Thursday was fairly active. Crystal Palace rose 1, and Ottoman ¼. On Friday, River Plate fell ¼. In Water, the debenture stocks of East London, New River, and West Middlesex advanced 1 each. Saturday was quieter, and quotations closed without any further changes.

Midland Association of Gas Managers.—We learn from Mr. A. Cooke, of Oldbury, the Hon. Secretary, that the spring meeting of the Association will be held at Nuneaton, on Thursday, the 2nd of June.

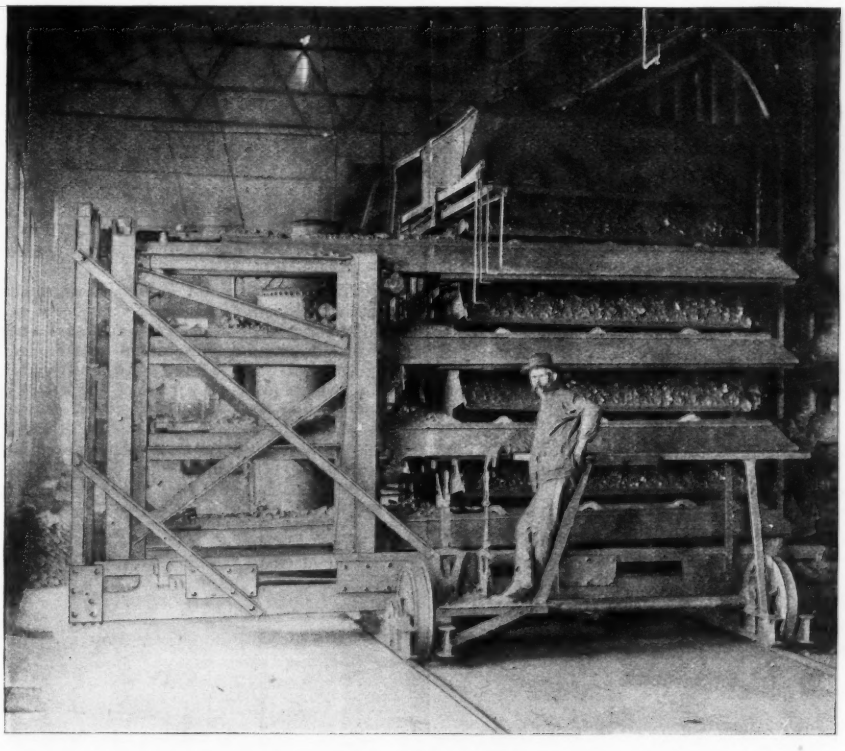
The Manchester and District Junior Gas Association will hold their next meeting on Saturday, when a visit will be paid to the works of Messrs. Graham, Morton, and Co., Limited, at Hunslet, near Leeds.

THE BRONDER RETORT-HOUSE MACHINERY.

Drawing or Charging Four Retorts Simultaneously—A Bucket Hot-Coke Conveyor and Steam-Exhauster.

THE novelty for English gas engineers of the retort-house machinery inventions of Mr. G. A. Bronder, of New York, is a sufficient reason for publishing additional information and illustration in regard to it; and both we took steps to secure on receiving from Mr. S. Y. Shoubridge, the Engineer of the Crystal Palace District Gas Company's works, the interesting photographs (recently reproduced) that had been forwarded to him portraying the three-tier charging and drawing machines which are in operation in Toronto. Since then the publications of the Ohio Gaslight Association have made us acquainted with the fact that the charging or drawing of three retorts simultaneously is not the goal of Mr. Bronder's ingenuity. He has surpassed that by building machines, which are also in operation, to deal with four retorts in one operation. It will thus be seen that what is a novelty for gas engineers in this country is not so now among our American friends; and it may certainly be taken as a sign of satisfaction on their part (or on the part of several of them) with the performance of the machines when we find that the discharging-rakes for dealing with three or four retorts at once are in use at the works of the Consolidated Gas Company in New York, the United Gas Improvement Company in Philadelphia, Mount Vernon, and Newark (N.J.), the Toronto Consumers' Gas Company, the Worcester (Mass.) Gaslight Company, the Detroit City Gas Company, and the Montreal Gas Company; while the charging-machines are doing service at all of these works, excepting Worcester and Newark. Through the kindness of Mr. Bronder, we are able to give photographs of examples of the four-rake and four-scoop machines now at work.

By consulting previous publications in the "JOURNAL,"* details of the construction of the machines can be gathered. But generally it may be stated, from the particulars now to hand, that the machines can be driven by steam or electricity. Where steam is used, the boiler is fed with hot coke direct from the retorts. The propelling of the machines along the front of the benches is performed by a steam-engine. The rakes are operated simultaneously by one man, clearing (as the case may be) three or four retorts at a time; but, when some of the retorts are being scurfed, one or more rakes can be used indiscriminately as desired. The figures supplied show that a three-rake machine can draw 42 retorts in from



THE BRONDER FOUR-SCOOP CHARGING-MACHINE.

fifteen to twenty minutes; a four-rake one will draw 56 retorts in the same time. This, it is pointed out, is actual work.

Regarding the three or four scoop charging-machines, each scoop is capable of holding from 300 to 460 lbs. of coal, according to the size of the retort. The scoops are likewise operated simultaneously by one man, who also fills them by means of pushers worked by small steam-engines. The outer end of the scoop (as explained in the previous article) is provided with a flange or horn, which causes the coal, when the scoop is retiring, to spread well against the sides of the retort; and as the layer is automatically deposited in the scoop to be heavy in front, with a gradual lightening towards the back, a layer is obtained (says Mr. Bronder) in accordance with the heat, and so a maximum weight of coal is perfectly carbonized all through. As with the rakes, so with the scoops, one, two, three, or four can be used indiscriminately when retorts are being scurfed. The performance of a charging-machine with one man is found to be equal to that of a drawing-machine—viz., with a three-scoop machine 42 retorts can be charged in from fifteen to twenty minutes; and with a four-scoop machine, 56 retorts in the same time.

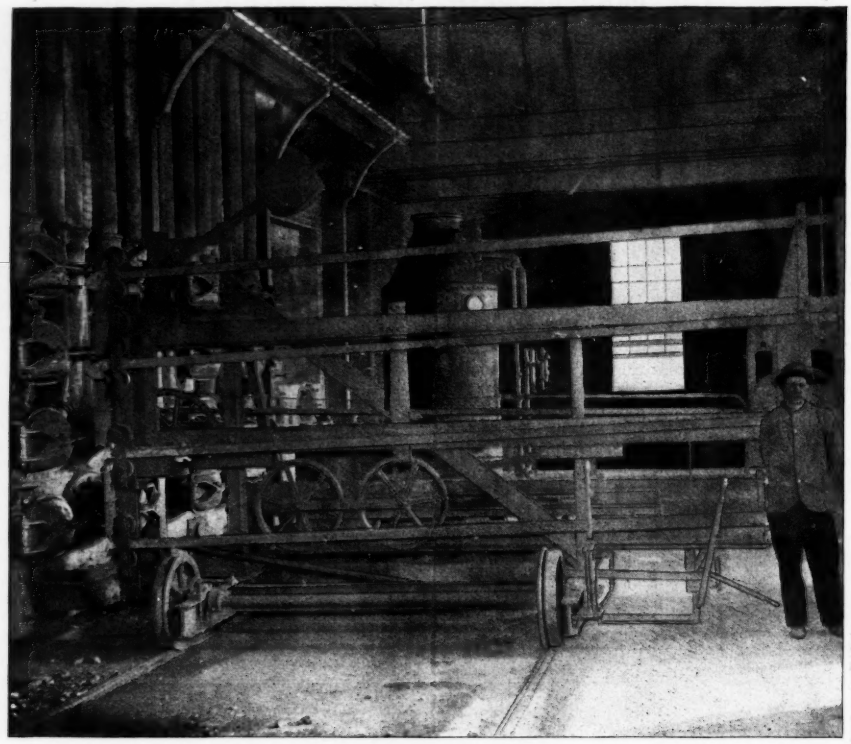
In this connection a cost sheet supplied by Mr. W. H. Pearson, jun., the Superintendent of the Toronto Consumers' Gas Company, is of interest. It will be remembered that the photographs previously published were of the three scoop and rake machines at Toronto. The figures from these works show the cost per 1000 cubic feet of gas, including, be it remarked, all the men engaged on the coal and coke conveyors, machines, retort-lids, and furnaces complete. On the four-tier retort-beds, with four-tier machines, the cost would, of course, be proportionately less. However, Mr. Pearson writes: "We can work 178 mouthpieces, yielding 10,000 cubic feet per mouthpiece per twenty-four hours, charging about 365 lbs. of coal. This would give us 1,780,000 cubic feet per twenty-four hours. Allowing for retorts being off 'carboned,' this would slightly reduce the make. The number of men required to operate, as above, is as follows:—

2 fire men 6 lid men 2 top men 4 machine men 4 furnace men 2 coke conveyor men 1 coal conveyor man	Total 21 men, making 1,780,000 cubic feet.

1,780,000 cubic feet, divided by 21 men, equal 84,762 cubic feet per man per day. 21 men × $2.25 per day, equal $47.75, which equals 2.68 c. per 1000 cubic feet." Mr. Pearson adds that he is quite satisfied that these results can be realized continuously with the above number of men.

This brings us to another invention, or rather a combination of inventions, by Mr. Bronder; and that is his hot-coke bucket conveyor, quencher, and steam-exhauster. To illustrate this

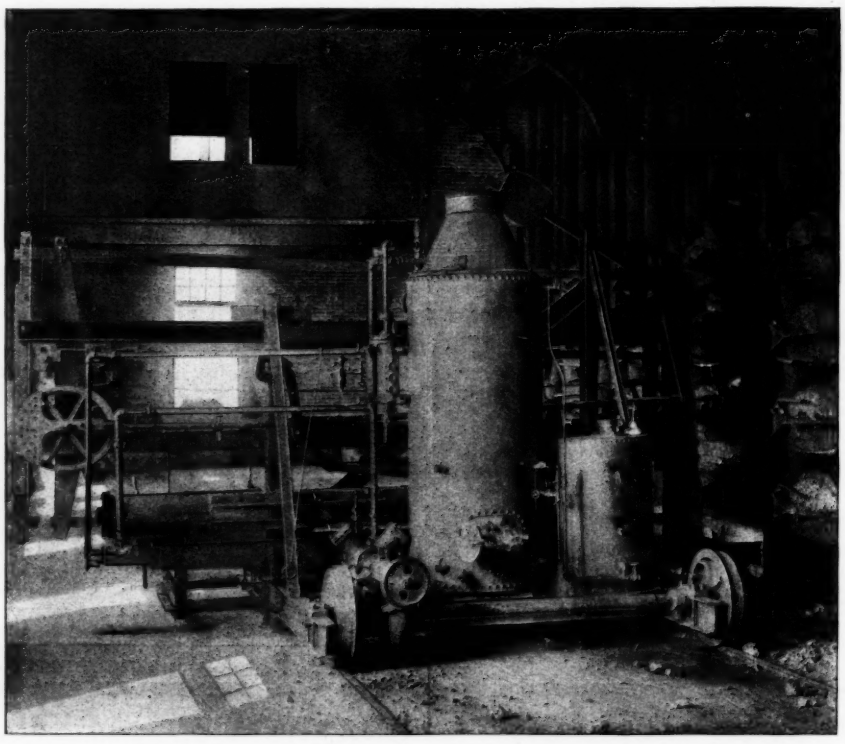
* See "JOURNAL." Vol. LXXXV., pp. 216, 834.



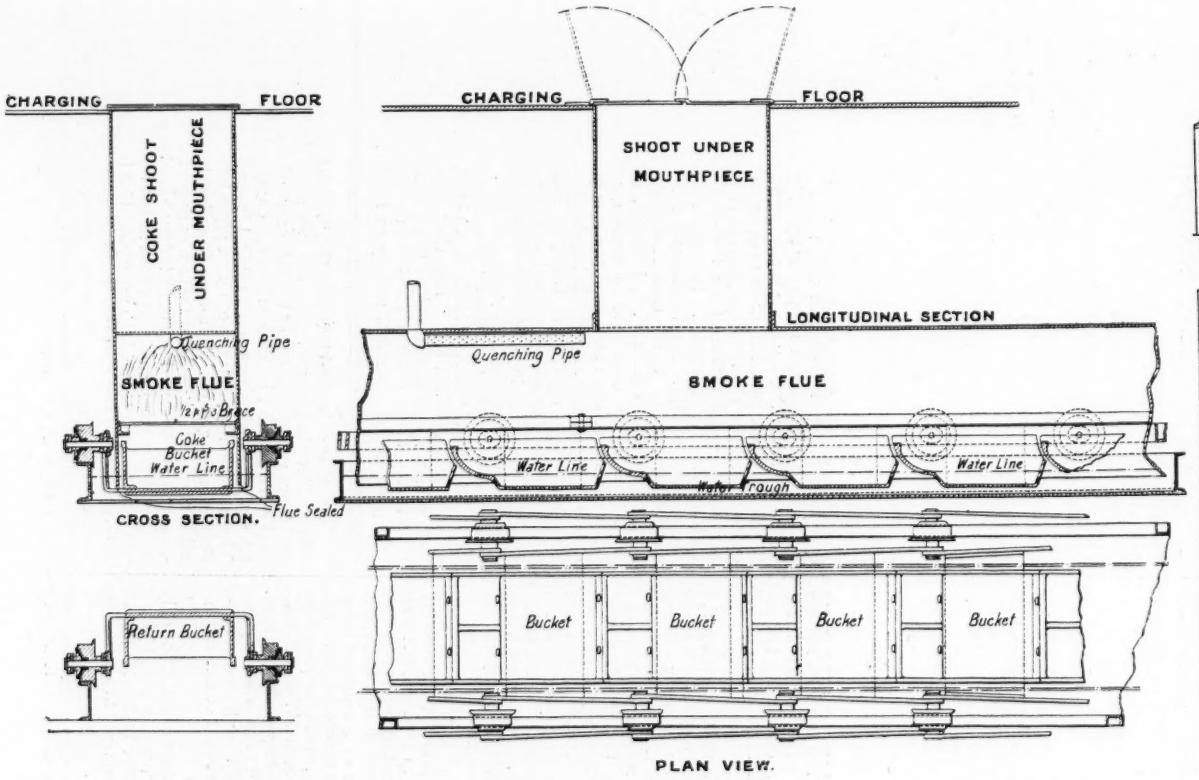
THE BRONDER FOUR-RAKE DRAWING-MACHINE.

portion of the article, a plan is given of the Toronto coal and coke conveyor, and other drawings show the arrangements of the Bronder conveyor, quencher, and steam-exhauster.

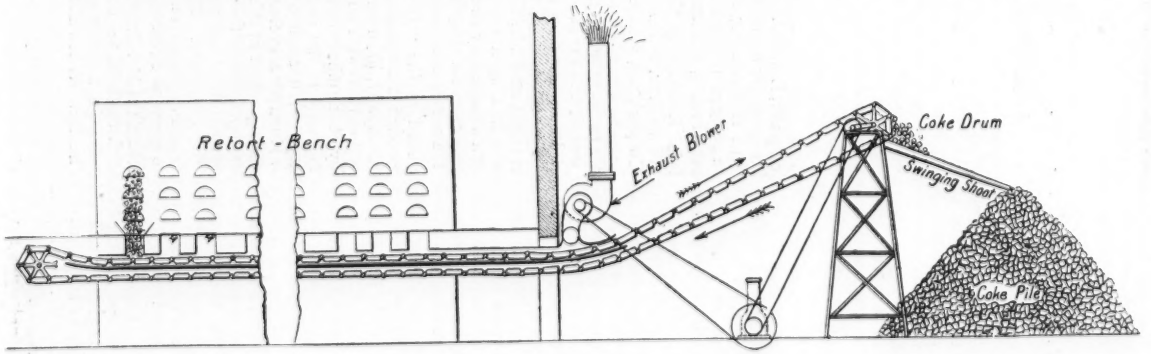
From the descriptive particulars supplied, it is learned that the water-trough in which the conveyor works is filled, through its entire length, with water, which is kept circulating by means of a water-wheel. The bucket chain runs in the trough; the sides forming the tracks for the rollers. A flue covers the whole length of the chain; the lower edges of the former dipping into the water to form a seal. The flue connects at each bench with one or more shoots, through which the coke drops into the buckets. When not in use, the buckets are covered. At the ends of the trough and flue, care is taken to prevent considerable leaks of air between the conveyor chain and the sides and top. The flue is also connected by a large pipe to an exhauster, driven by steam, by means of which all the steam created by the contact of the water and hot coke is exhausted, and sent to a chimney, which carries it high above the roof of the retort-house. The bucket conveyor chain being carried on rollers running on the outer edges of the trough, and outside the sealed flue, it is evident that not only can the rollers never become hot, but no coke dust can interfere with their pins. They are oiled automatically; each being provided with felt-filled chambers—lubrication being accomplished by contact while passing.



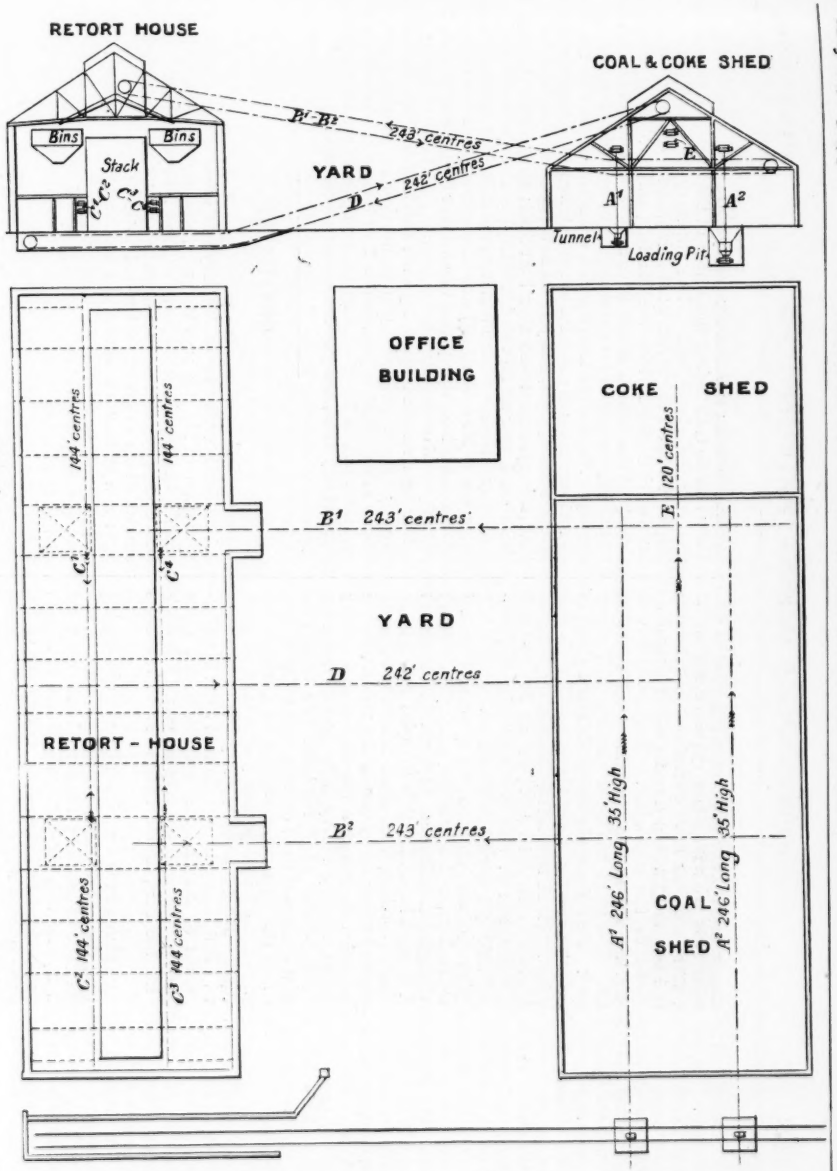
VIEW FROM THE OPPOSITE SIDE OF THE BRONDER FOUR-RAKE DRAWING-MACHINE.



PLAN OF GENERAL ARRANGEMENT OF THE BUCKET HOT-COKE CONVEYOR, QUENCHER, AND STEAM EXHAUSTER.



HOT-COKE CONVEYOR, AND EXHAUST BLOWER FOR STEAM.



PLAN OF THE TORONTO COAL AND COKE CONVEYOR SYSTEM.

Now referring to the drawings to see the application of the system. The conveyor lines are built about 150 feet centres. At the Toronto works, there are four lines dumping the coke into one cross line D, and one longitudinal line E, which continues the travel of the coke to the coke-shed. The coke is well quenched, and the cellar is free from any steam, which allows of windows being used. The plant has been running at Toronto since September, 1902. Each conveyor line is driven by one of the Bronder four-cylinder engines, a photograph of which was given on March 29 last. There is a certain amount of wear on the pins of the rollers due to the coke dust; but as they are well protected, continually lubricated, and made for easy replacements, maintenance is brought down to a minimum.

On the general plan will also be seen the system of bucket coal-conveyors, coal-crushers, and transverse conveyors feeding the bins over the charging-machines at Toronto. This system works as follows: A waggon load of coal is dumped into a large hopper above the crusher—taking from about fifteen to eighteen minutes to be broken, and taken up by one of the two conveyors A^1 A^2. This coal can either be stored in the coal-shed (capacity about 12,500 tons), or be directly conveyed by one of the cross lines B^1 B^2 into the retort-house, emptying there into large bins (each containing about 80 tons of coal) on each side of the retort-stack. These bins feed the charging-machines by gravity—the machine hopper being large enough to take 5 or 6 tons of coal; and the machine, without being reloaded, is capable of charging from 24 to 30 retorts, If it is desired to take coal from the coal-shed, the coal is caused to descend through shoots and gates feeding the return bucket chains in the tunnels under the coal-shed, which chains lift the coal, and deliver it on to the cross conveyors B^1 B^2.

In the coke and coal plants here described, the use of a bucket conveyor for receiving the spent charges from the retorts will have especial interest; the methods by which the buckets are fed and the working parts protected, together with the exhaustion of the steam, forming important features. The exhaustion of the steam arising from the quenching of the hot coke is a practice that has not yet come into vogue in this country; but one home retort-house plant contractor we know has designed an arrangement for this purpose.

PERSONAL.

Among the gentlemen just added by the Lord Chancellor to the Commission of the Peace for the borough of Swansea, we are pleased to find Mr. THORNTON ANDREWS, M.Inst.C.E., who has for some years been Engineer, Manager, and Secretary of the Gas Company. The many friends of Mr. Andrews will, we are sure, unite with us in offering him hearty congratulations on this recognition alike of his judicial and business ability.

Among the graduates in science at the recent graduation ceremonial of the Edinburgh University was Mr. GEORGE PERCY LISHMAN, Analyst to the Lambton Collieries, Limited, and to the Wearmouth Coal Company, Limited. Mr. Lishman received the degree of Doctor of Science for his thesis on "The Testing of Gas Coal for Gas Yield and Illuminating Power," embodying the result of work which has been carried on for some years in his laboratory near Fence Houses, Durham.

At the meeting of the Leeds City Council on Wednesday, the salary of Mr. R. H. TOWNSLEY, the General Manager of the Gas Department of the Corporation, was raised by £100 per annum. Mr. Townsley has been in the service of the Corporation for 26 years, for ten of which he was the Chemist, for seven the Manager of the York Street works, and for the rest of the time has filled his present position. In bringing up the practically unanimous proposal from the Gas Committee, the Chairman (Alderman Lowden) pointed out that under Mr. Townsley's management the plant at the gas-works had been revolutionized, and the whole of the works were in a satisfactory condition. It is gratifying to find that the advance was granted by a considerable majority, in striking contrast to the case mentioned last week.

As already announced in the "JOURNAL," Mr. A. CANNING WILLIAMS, of Scarborough, has obtained the position of Secretary of the Reading Gas Company, in succession to the late Mr. A. H. Cane; and in connection therewith an interesting ceremony took place last Wednesday at the offices of the Scarborough Gas Company, when Mr. Williams was the recipient of a massive brass and oak chiming timepiece, subscribed for by his colleagues. Mr. Alexander Allan, the Manager and Secretary, made the presentation, and while expressing regret at the loss of Mr. Williams, congratulated him on his appointment to a more responsible position. Mr. Williams suitably responded, and referred to the sixteen years he had spent with the Company. He said that he considered the gift most suitable and appropriate, for it would constantly remind him of the time spent at Scarborough.

The professional friends of Mr. CHARLES MEIKLEJOHN, not only in the Midlands, but throughout the country, will be glad to hear that he has returned from his trip eastward, in the *Argonaut*, greatly improved in health. When a man can write to his friends, as Mr. Meiklejohn does, that he sleeps well, eats well, feels well, and altogether is sure that the trip has done him much good, then his friends have good reason to rejoice with him. Mrs. Meiklejohn accompanied her husband; and they had a very enjoyable cruise. They had no rain during the whole of the time, and the weather was splendid throughout. The itinerary included Marseilles, Naples, Pompeii, the Straits of Messina, and across the Adriatic to the Gulf of Corinth. Here they landed; and Mr. Meiklejohn might there (and later on elsewhere) have been seen making a two to three hours' pilgrimage in, for those parts, the orthodox manner—on a donkey. Athens, the Dardanelles, Constantinople, and the Bosphorus were visited; and Palestine followed—the roads of Haifa, Mount Carmel, Jaffa, and Jerusalem being trodden in turn. From Jaffa, the voyagers steamed for Port Said; and days were spent in Cairo and Luxor visiting ancient temples, and the tombs of Kings. A railway collision on the banks of the Nile (but fortunately the damage was of small extent) was among the sensations of the trip. Several other historical places came under the gaze of the travellers in Egypt and on the homeward journey; the last call before Marseilles was reached being Ajaccio, in Corsica. Mr. Meiklejohn strongly recommends the trip to worried gas managers. "The beauty of it," he says, "lies in this, that it is no good writing letters and none can be received, there is no opportunity for mentioning work of any kind, and yet one is busy every day."

OBITUARY.

The death occurred on Monday last week, at his residence at Wrexham, of Mr. THOMAS WALKER, who for between 25 and 30 years held the position of Secretary and Manager of the Wrexham Gas Company, which he relinquished only a few years ago. Deceased, who was greatly respected in the town, was 61 years of age; and he leaves a widow, one son, and two daughters.

The death took place on Sunday, the 1st inst., at his residence at Southport, of Mr. GEORGE GARSIDE. Deceased was a Director of the Cefn Mawr Gas Company. About forty years ago, his father, the late Mr. John Garside, of Ashton-under-Lyne, discovered valuable beds of cannel and coal in the Vale of Llangollen. He opened out the mines for Mr. Abel Buckley, and his son George assisted him as Manager. On the death of his father, he took sole charge. He was 55 years of age, and leaves a widow, two sons, and five daughters.

It is with sincere regret that we record the death on Friday, at his residence at Hindhead, of Dr. ALEXANDER W. WILLIAMSON, F.R.S., who for many years held the position of Chief Gas Examiner for the Metropolis. Dr. Williamson was born at Wandsworth on May 1, 1824, and consequently he had just entered his 81st year. He received his education in England, France, and Germany; studying chemistry under Gmelin at Heidelberg and under Liebig at Giessen (where he graduated Ph.D.), also spending some years in the study of the higher mathematics under Comte in Paris. In 1849 he was appointed Professor of Practical Chemistry, and in 1885 Professor of Chemistry, in University College, London, where he continued to teach till 1887, when he retired with the title of Emeritus Professor. He became a Fellow of the Royal Society in 1855, receiving a Royal Medal in 1862; and he had also been its Foreign Secretary from 1873 to 1889. He was twice President of the Chemical Society—in 1863-65, and again in 1869-71; and having been elected a Fellow in 1848, he was one of the six guests of the evening at the banquet given in London by the Society in 1898, in honour of those of its Past-Presidents who had been Fellows for half-a-century. He was President of the British Association in 1873. Dr. Williamson was the second occupant of the position of Chief Gas Examiner for the Metropolis; having in 1876 succeeded Dr. Letheby, who was appointed on its creation. He continued to discharge the duties till about three years ago, when advanced age and failing sight compelled him to resign; Lord Rayleigh being chosen as his successor. He had honorary degrees from Glasgow, Dublin, and Edinburgh, was a member of various learned societies at home and abroad, and took an active part in the establishment of science degrees and of a teaching university for London. Among his literary productions may be mentioned "Chemistry for Students," "The Atomic Theory." "A New Method of Gas Analysis," jointly with W. J. Russell, Ph.D., and "The Unit Volume of Gases." Dr. Williamson leaves a widow (the third daughter of Professor T. Hewitt Key, F.R.S.), one son and one daughter. The funeral will take place at Brookwood Cemetery on Friday.

Corrosion of Water-Pipes.—In the "Zeitschrift für angewandte Chemie" for last month, there are two short communications in which are reported cases of the corrosion of water pipes. In one of the articles, Dr. Rinck ascribes the damage to leakage of electricity, of which there were several possible sources present. The corrosion took place both with pipes lying exposed and those buried in the ground. In a case described by Herr Koch, on the other hand, it is stated that there was no possibility of an external source of electricity; but currents may have been set up between the different parts of the iron pipes, or between the iron itself and the graphite it contained. This explanation is rendered the more probable by the fact that the drainage water in contact with the outside of the pipes was distinctly saline. The presence of this in the water would make it conduct electricity fairly well, and therefore assist the electrolytic attack of the iron.

JUBILEE OF THE SOCIETY OF ENGINEERS.

Members of the Society of Engineers held their Jubilee Meeting at the Royal United Service Institution on Monday last week, under the presidency of Mr. D. B. Butler. The proceedings were specially interesting from the fact that Mr. Perry F. Nursey, the Secretary and a Past-President of the Society, who has been connected with it almost from its organization—having joined its ranks in 1858—and has worked for it without a break ever since his election, read a sketch of its progress.

After briefly alluding to his long connection with the Society, and expressing his pleasure at being associated with it, Mr. Nursey proceeded to point out that, though it was established in 1854, it was not then known by its present name. For the first three years of its existence, it was called the Putney Club, having been founded by students of Putney College—an institution which formerly existed for the education of engineers. The founders were Robert Monro Christie, Henry Palfrey Stephenson, and Alfred Williams, the latter of whom held the office of Honorary Secretary and Treasurer till his death in 1894. The members used at first to meet periodically at the offices of Mr. Christie and Mr. Stephenson, when various points of engineering practice were introduced and discussed, on the lines of the topical discussion system which is now so largely in vogue in the United States, and which was successfully adopted on one occasion last year by the Society. In 1855, however, the formal reading and discussion of papers was commenced.

At the annual meeting of the members of the Putney Club held on Dec. 7, 1857, the Society received its present name. At that date the number of members had increased to 54 from 25, which latter was its strength at the close of 1855. This increase of numbers necessitated a larger meeting-place, and No. 4 Committee Room in Exeter Hall was taken for the purpose. In course of time, this proved too small, and the lower hall was engaged for the meetings, which were held there for some years. A prominent feature of the year's work in 1858 was the awarding, for the first time, of premiums of books for papers read during that period. The year 1861 was marked by the holding of a *conversazione* in the lower hall, Exeter Hall, on June 11—a function successfully repeated in 1863. A feature of the latter year was the introduction by Mr. Williams of vacation visits to works of engineering interest; the first being to the Southern Outfall of the Main Drainage Works of the Metropolis. Later in the year the Northern Outfall was visited. The year 1863 witnessed the institution of the class of honorary members, though none were elected until 1865. Among the earliest honorary members were Lord Playfair, Sir William Fairbairn, Sir John Herschel, Sir Joseph Whitworth, Dr. Percy, and Professor Rankine. In 1864, the question of issuing certificates of membership was discussed, but their issue was not then considered desirable. They were, however, adopted in 1867 in their present form.

Proceeding to generalities, Mr. Nursey next touched upon the membership roll and the useful work done by the Society during its fifty years of existence. Referring to the figures of membership in the early days, he said that the rate of subsequent progression had been somewhat irregular. In 1893, the Society touched a maximum, when it had a record number of 522 members. After that it declined a little; but in 1902 the previous record was beaten by one—the membership standing at 523. Last year witnessed a marked advance upon that; the Society numbering 540 members at the close of the year. The upward movement is still going on, inasmuch as during the present year there have, so far, been elected eight new members, which, with the seven to be balloted for at the close of the meeting, practically brought up the numerical strength to 555 members and associates.

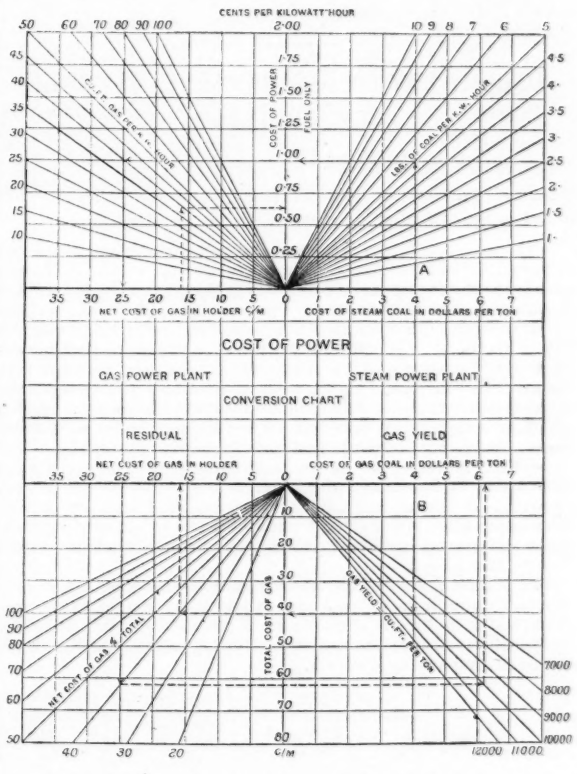
As regards the useful work done by the Society, Mr. Nursey directed attention to the fact that they had published 44 volumes of Transactions, including that for the past year. They contain 10,124 pages, and embody 371 papers, illustrated by 588 plates and 294 smaller engravings. In some cases, the same author had given several papers. Among these may be mentioned Mr. Baldwin Latham with eight papers, Mr. Arthur Rigg with a like number, Mr. Vaughan Pendred and Mr. C. J. Light each with six, Mr. Henry O'Connor with four, and Mr. Nursey himself with twenty-two—including in all cases, except that of Mr. Light, a presidential address.

"Such then, in brief," said Mr. Nursey in conclusion, "is the record of the Society for the first half-century of its existence. To me it is a record of pleasant memories and associations—of memories of those with whom I have worked shoulder to shoulder, but who have passed away, and of associations with those who have taken their place, and with whom I am now working to promote the general interests of the Society, which work to its Executive has ever been, and still is, a labour of love. I refer here to our members of Council, who are the worthy successors of our worthy founders, Henry Palfrey Stephenson, Robert Monro Christie, and Alfred Williams."

It may not be out of place to supplement Mr. Nursey's interesting retrospect by a brief reference to the connection with the Society of a number of gentlemen more or less closely associated with gas and water engineering. Mr. H. P. Stephenson, whose name has just been mentioned, was President in 1856 and 1859, Mr. W. H. Le Feuvre in 1867, Mr. Baldwin Latham in 1868 and 1871, Mr. Jabez Church in 1872-3, Mr. R. P. Spice in 1878-9, Mr. Charles Horsley in 1881, Mr. Jabez Church, jun., in 1882-3, Mr. Charles Gandon in 1885, Professor Henry Robinson in 1887, Mr. A. T. Walmisley in 1888, Mr. W. A. Valon in 1893, Mr. H. O'Connor in 1900, and Mr. Percy Griffith in 1902. Among other contributors to the proceedings may be mentioned Messrs. C. C. Carpenter, E. C De Segundo, Charles Gandon, E. A. Harman, F. W. Hartley, A. Le Grand, Vivian B. Lewes, R. E. Middleton, W. Morris, E. Lloyd Pease, John Somerville, W. T. Sugg, J. C. Thresh, B. H. Thwaite, J. A. Wanklyn, and A. F. Wilson. It is not a little curious that one of the numerous papers read by Mr. Nursey was on "Illumination by Means of Compressed Gas." This subject he brought before the members in 1881.

COST OF STEAM AND GAS POWER.

In the last volume of the "Journal" (pp. 154 and 271) we gave the principal portions of a paper on "Gas Power for Operating Electric Central Stations in Connection with Gas-Works," presented by Mr. J. R. Bibbins at a meeting of the American Institute of Electrical Engineers. The author has evidently devoted considerable attention to this subject, as in the issue of "Power" for March he published a chart intended to furnish general data upon the comparative cost of fuel for steam and gas power plants under various conditions and efficiencies. We reproduce it, with the accompanying explanatory remarks.



The upper section of the chart determines the cost of power directly; the lower is a conversion chart for determining the production cost of gas in the gas-generating plant. Referring to the upper right-hand quadrant, the diagonals represent the gross coal consumption of a steam plant in terms of useful output. A trial setting is indicated by the line A. For example, with coal at $4 per ton and a gross station economy of 5 lbs. of coal per kilowatt-hour, the cost of power at the switchboard is 1 c. per kilowatt-hour. The economy chosen is rather low for small plants, but represents a fair average for moderate-sized condensing plants of several thousand horse power capacity. In the upper left-hand quadrant, the diagonals represent in a similar manner the gross economy of a gas-power station. Following out the trial setting with gas at 25 c. per 1000 cubic feet and a gross economy of 40 cubic feet of gas per kilowatt-hour, the cost of gas power at the switchboard is 1 c. per kilowatt-hour. With plants of considerable size, much better results could be realized.

In the lower right-hand quadrant, the diagonals represent the gas yield per ton of coal gasified. The usual average is 10,000 cubic feet per ton. With gas at $4 per ton (line B), the total cost of gas at the above yield is 40 c. per 1000 cubic feet. As a considerable saving is, however, derived from the sale of residuals, the actual cost of gas in the holder is obtained by deducting the equivalent percentage of cost. In the lower left-hand quadrant, the ratio of net to gross cost is represented by diagonals. Thus, if the sale of residuals amounted to 60 per cent. of the cost of

coal, with gas at 40 c. per 1000 gross cubic feet, the net cost in the holder is 16 c., at which rate it should be charged to the engine for comparative results. Usually, residuals secure a greater return than 60 per cent., particularly in places where the price of coke is high; and it frequently occurs that the entire cost of fuel is returned. In this case, therefore, the fuel cost of gas power would be nothing.

The following two sample settings worked out on the chart indicate its use:—

1.—At a given price for steam coal, how much can works afford to pay for gas coal for the same cost of power?

Assumptions.

Steam coal—$4 per ton.
Steam-station economy—5 lbs. per kilowatt-hour.
Gas-station economy—40 cubic feet per kilowatt-hour.
Ratio net cost of gas to gross cost—40 per cent.
Gas yield—10,000 cubic feet per ton.

Solution.

Gas coal—$6·20 per ton.
Cost of power—1 c. per kilowatt-hour.

2.—With steam and gas coal at the same figure, what are the comparative costs of power?

Assumptions.

As above.

Solution.

Steam plant—1 c. per kilowatt-hour.
Gas plant—0·675 c. per kilowatt-hour.

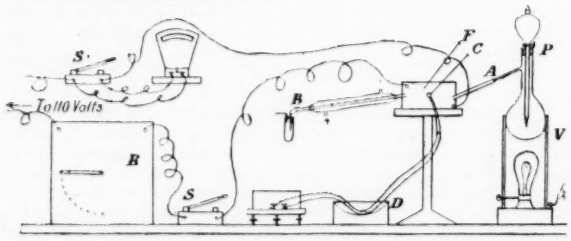
The chart may, of course, be applied to any individual case by making the corresponding assumptions.

DECOMPOSITION OF BENZENE AT HIGH TEMPERATURES.

The current number of the "Journal of the Society of Chemical Industry" contains the following paper on the above subject submitted to the Canadian Section by Mr. G. W. M'Kee.

In the manufacture of both coal gas and carburetted water gas, it is a matter of great practical importance that we should have a knowledge of the temperatures at which the various hydrocarbons decompose, especially those used for enriching purposes, and the extent to which the decomposition increases with rising temperature. The most important among these reactions is the decomposition of benzene (C_6H_6). Suppose, for instance, we start with the gas oils which are higher normal paraffins, the pyrogenetic reactions are such as are indicated by the following: Higher paraffins ⟶ lower paraffins ⟶ olefines ⟶ acetylenes ⟶ benzenes ⟶ diphenyl, &c. ⟶ naphthalene, &c. ⟶ tarry matter ⟶ carbon and hydrogen. The great value of benzene in increasing the illuminating value of gas is well known; and the nuisance that arises from the formation of solid substances like diphenyl and naphthalene, which stop up both pipes and machinery, is one of the greatest obstacles in the manufacture of coal gas.

The precise nature of the above reactions therefore becomes of practical importance; and the experiments carried out were undertaken to throw some light, if possible, on the transition temperatures of these substances. The apparatus used is shown in the accompanying diagram.



To heat the furnace F, the rheostat R and the furnace were joined in parallel, and connected with the street circuit. The switches S were also inserted to permit of complete control of the current from the working table. The furnace was heated by means of hot platinum resistance wires embedded in its fire-brick walls. It was found convenient to surround it with ¾-inch asbestos millboard, pieces of which were readily cut without disturbing the edges, by placing it between pine boards and using a saw. In front of the furnace was placed a piece of asbestos with three holes, which were punched by means of a sharpened brass tube against a hardwood block. Two of these were for the inlet and outlet of the copper tube which was to carry the benzol vapour, while the third, C, was for the introduction of a thermo-couple.

The pyrometer used was a Le Chatelier. A thermo-couple, 50 centimetres in length, of platinum and platinum with 10 per cent. of rhodium, was introduced into the furnace by means of a porcelain tube about ⅛ inch in diameter, and perforated by two holes, each about 1 millimetre in diameter. To the thermo-couple were joined the copper wires in the porcelain dish D, which was kept at zero by means of melting ice. The copper wires were joined, as shown, to the pyrometer, which was provided with an auxiliary switch. The calibrations of the thermo-couple were plotted on section paper for interpolation purposes.

For vaporizing benzene, the device shown at V to the right of the figure was used. An electric lamp was mounted on a block, on which was secured a piece of tin pipe about 4 inches in diameter. A piece of ¼-inch asbestos was cut and rolled to fit the inside of the tin, and thus prevent loss of heat by radiation. The benzene to be decomposed was placed in the pear-shaped funnel P. The stem of this funnel was so drawn out that the drops issuing from it would be very small; the supply was further capable of control by the tap on the stem of the funnel. In this way, small drops of benzene were allowed to fall on to the heated bottom of the flask, where they were at once vaporized, and subsequently passed through the furnace—the rate being easily regulated by counting the drops.

About 6 feet of seamless copper tubing, thin-walled, and about ¼ inch external diameter (the temper drawn by passing it slowly through a blowpipe flame), were coiled around a prepared spool, so that a coil of about 4½ feet of it fitted nicely in the furnace, leaving an aperture between the coils sufficiently large to allow of the tube which insulated the thermo-couple being passed through to the middle of the furnace. The ends of the copper tube passed through the holes shown in the asbestos pad which formed the door of the furnace—and were bent at right angles so as to terminate at A and B.

The distilling flask was selected so that its delivery tube fitted accurately into the copper tube at A; and the joint was further secured by means of suitable packing. The other end of the copper tube was provided with a short glass condenser, 6 inches in length; while an adapter of glass tubing was slipped over the end of the copper tube, and secured by means of a section of rubber tubing. The adapter passed through a stopper into a small glass vessel in which were caught the products of decomposition.

To determine whether or not the benzene had been decomposed, specific gravity determinations were made by means of a pyknometer. In all cases these were taken at 18° C.; the variation of the specific gravity of benzene for a difference of 1° C. being very considerable. The results are tabulated below.

	Per Cent.
Specific gravity of benzol employed	0·88181
,, products after heating to 448° C. .	0·88175
,, ,, ,, 550° C. .	0·88202
,, ,, ,, 664° C. .	0·88362
,, ,, ,, 720° C. .	0·88963
,, ,, ,, 765° C. .	0·90276

A second method of determining whether decomposition had taken place was to slowly evaporate a portion of the product to dryness, and examine the residue, if any, by the polarizing microscope. The following results were obtained:—

Quantity Evaporated.	Temperature to which it had been Subjected in Passing through Tube.	Appearance when Examined by Polarizing Microscope.
Cub. Cent.	°C.	
20	Not heated	No crystalline structure.
10	494	,, ,,
10	526	,, ,,
5	550	Polarization colours scarcely visible in residue.
5	562	Crystalline residue prominent; small crystals easily distinguished.

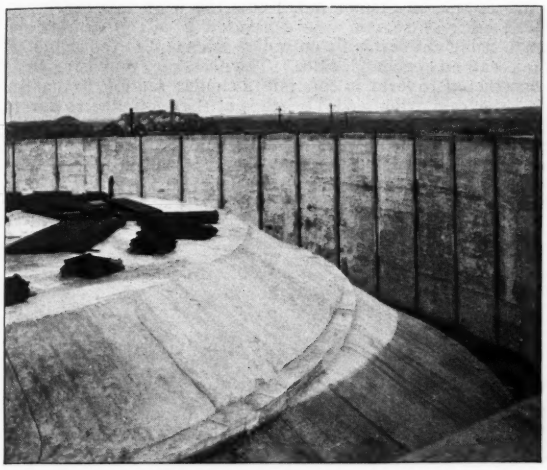
The tube was further washed thoroughly with pure benzol, and a number of fractions taken from 544° to 550°; but it could not be said that the action became decidedly perceptible until after 550° had been passed. From that point onwards the benzene vapours decomposed as the temperature rose. It would thus seem advisable, in adding enriching material to (say) a water gas, to prevent the added material from being subjected to a temperature much greater than 700° C. (1292° Fahr.).

Coal-Cutting Machinery.—At the Meeting of the Society of Engineers on Monday last week, a paper on "British and American Coal-Cutting Machines" was read by Mr. A. S. E. Ackermann, Assoc.M.Inst.C.E. The author first gave a brief history of coal-cutting machines, showing that the credit of the invention of each of the well-known types was due to Englishmen, though it has been left to Americans to perfect and make large use of most of them. The chief types of machines in use in Great Britain were described. It was stated that the average net saving on the cost of getting coal in England, as the result of the use of machines, was 6d. per ton; and that the average increase of output per man employed had amounted to 65 per cent. In addition to these advantages, coal got by machinery contained 12 per cent. more round coal. The cost of a complete plant was given as about £1000 per machine. The leading three types of American machines were also described, as well as the method of using them. The author observed that American experience was that, on an average, 10d. per ton was saved in the cost of getting by the use of machines.

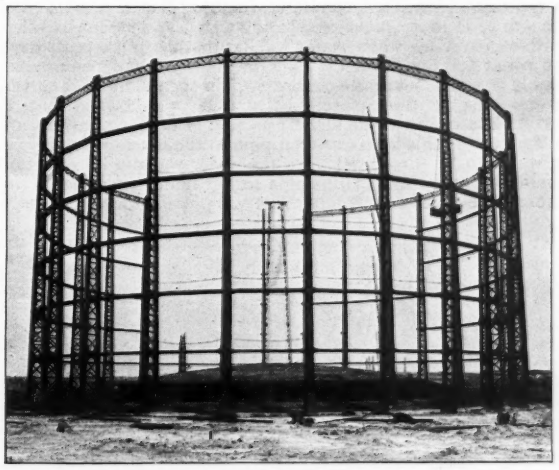
THE CONSTRUCTION OF A LARGE MODERN GASHOLDER.

At the Meeting of the Newcastle-upon-Tyne Association of Students of the Institution of Civil Engineers, on the 28th ult., Mr. W. Doig Gibb, M.Inst.C.E., read a paper entitled as above—taking as his illustration the large gasholder and tank which has been erected, for the Newcastle and Gateshead Gas Company, from his own designs at St. Anthony's. This holder was the subject of three articles in Vol. LXXVIII. of the "Journal;" but in the paper we find an extension of the information that we were then able to give as to its construction. At the time of its erection, it was the second largest holder in the Provinces, and the fourth largest in Great Britain. It provides a storage for 5½ million cubic feet of gas.

One of the drawings exhibited by Mr. Gibb showed the position of the holder and the nature of the ground as revealed by five boreholes. From the borehole sections, he said, practically nothing but clay was found, with the exception of No. 5, where wet sand was found some 5 feet from the surface. Clay was, however, got some 18 inches lower. It may be here recorded that the sand was found to be only a pocket, and that the experience of the actual excavation fully bore out the information obtained from the borings, and that no water troubles were



A View Inside the Completed Tank.



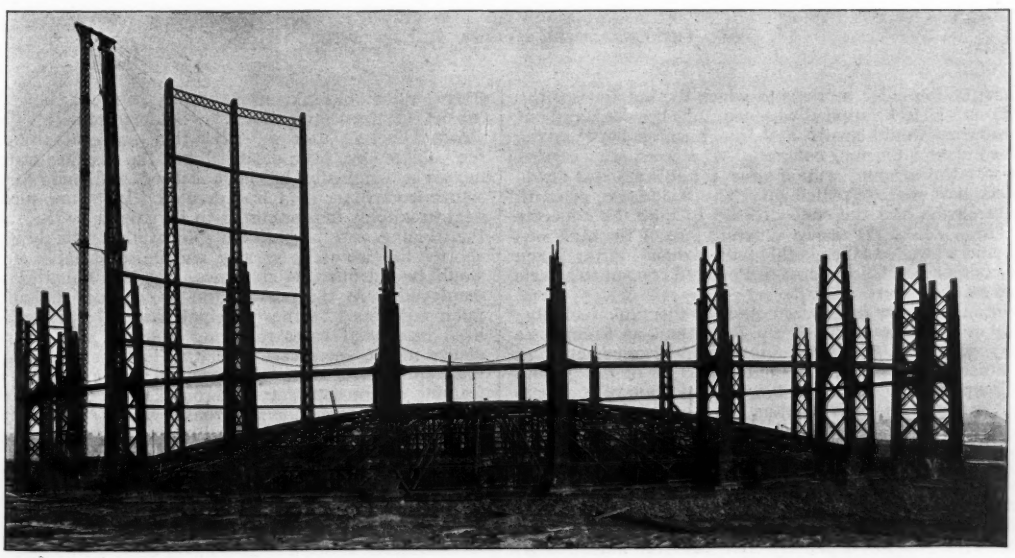
The Framing Nearing Completion.

experienced during construction; the surface water only having to be pumped as it collected in the excavations.

The general design of the tank and holder is as follows: A circular concrete tank was first constructed in the ground; the inside finished sizes being 239 feet diameter by 45 ft. 6 in. deep. On the top of the tank walls were erected, at equal distances round the circumference of the tank coping, 26 steel standards, each 134 ft. 7½ in. high; these being braced together by six rings of lattice girders, and by diagonal flat bars. Suitable guides were fixed on the inside face of the standards and tank, to guide the floating part of holder. This is of three lifts; the diameters being respectively 230, 233, and 236 feet, and the depth of each 45 feet.

The vertical walls of the tank are continuous throughout the entire circumference, with 26 piers carried up to take the 26 steel standards. These piers are also constructed in concrete, and are incorporated with, and form part of, the tank walls. The tank—near the inside edge—is 45 ft. 6 in. deep; and the bottom, for a distance of 8 ft. 6 in. out from the inside face of the tank, is made horizontal—this breadth being required to take the vertical rings of the holder when grounded. Rest-stones are bedded in the concrete floor ring, and project some 6 inches above it. There are 52 of these in the bottom of the tank; and the holder therefore rests on a very solid and level bottom. Here Mr. Gibb referred to the various square blocks of thicker concrete, in the bottom of the tank, taking the uprights of the crown-framing; and to the reinforcement of the concrete bottom of the tank itself by underribs running radially from its centre to the circumference. A brick pier forms the central support for the radial crown-framing. Embedded in the concrete of the walls of the tank are 15 strong flat-iron ties, running continuously round the walls. On the inside face of the tank are 52 steel channel-guides—the main ones running up to, and forming a continuous rail with, the guides fixed upon the faces of the standards; the 26 intermediate ones finishing slightly above the coping.

The inlet and outlet pipes are built of steel plate, and have an internal diameter of 3 ft. 6 in. The two rising and bottom pipes on the outside of the tank face are embedded throughout their entire depth in concrete, which, for this purpose, is carried out



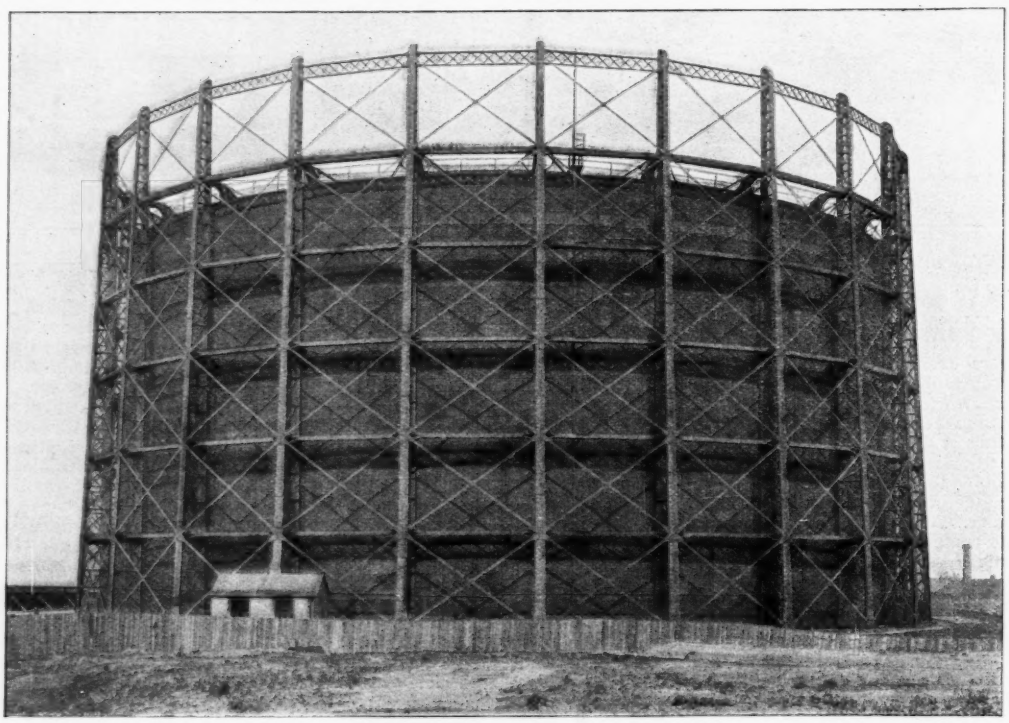
The Framing and Crown Work of the Holder in Course of Construction.

from, and forms part of, the main wall and bottom of the tank. On the inside, the two pipes rise from the tank bottom to a height of 8½ inches above water-level, and, for greater rigidity, the top ends of the pipes are tied together with a webbed angle tie. The author explained the necessity, as a certain amount of vapour condenses out of the gas, of making provision for drawing this off.

Reverting to the central pier, Mr. Gibb said that without this it would have been a matter of some difficulty to strongly connect up all the radial arms of the framing in a centre having a flat top; and it was thought desirable—and the design has been successful—that a brick pier should be erected in the centre in preference to steel work. This enabled the radial arms to be properly connected to a circular plate of considerable size; and advantage was also taken of the central brick pier to connect the diagonal tie-rods to channel-iron rings let on to, and carried by, the outside of the brick pier. As to the use of a central 6-inch cast-iron pipe in the brick pier, the precaution of putting this in was taken on account of so many tanks of similar construction having had their bottoms burst up when water was let in, due to the pressure of the water forcing down the concrete bottom, and compressing the air or water below the concrete; this eventually finding vent by cracking up the concrete bottom. It was argued that, by putting in a cavity at the highest portion of the tank bottom, and by connecting this by a cast-iron pipe to the outside air, any air or water to be forced out when the water was put into the tank would get vent through this pipe rather than by forcing its way through the concrete. A top flange was provided for this pipe, so that, after the tank had settled into its permanent position, a gas-tight joint could be made; there being then no possibility of gas leaking through the pipe into the ground below the tank. The flange was left off until after the tank had been filled with water to its full depth, and had stood for a considerable time. The pipe was then closed, and the pier filled in with concrete.

The Contractor was given a free hand in the methods he adopted in constructing the work; such methods, of course, having to be approved by the Engineer. The construction was carried out as follows: It was decided that the vertical walls of the tank should be put in before any excavation was done on the inner core of earth. This was wise, since the inner core could then be utilized for the support of the timbering required in constructing the vertical walls. The vertical wall itself was divided into separated sections; the excavation for a small number of those being carried on at the same time.

Describing in greater detail how the work was executed, Mr. Gibb said: A section was excavated from top to bottom; the earth being cut vertically on radial sides and to the shape of the tank wall on concentric sides. The necessary timbering was then constructed to form in concrete a similar section to that shown on a diagram exhibited. The steps of the section were dovetailed both on their vertical and horizontal faces, so that, when the next section came on, a firm joint would be made with the older section upon which it was erected. It will be perceived that, when two of the sections were constructed, the intermediate section could be readily constructed between them. Care was taken



The Completed Holder at Newcastle.

that the faces of the older sections to which the concrete of the newer sections was to be applied were carefully brushed, and put into such order as would ensure a thorough union between the faces of the old and the new concrete. The work was carried out in this way throughout; section after section being put down, and the place between each filled up. The inside core of earth was then removed, and the cone dressed to take the concrete bottom. The whole of the inside concrete face of the tank was then fixed, and trowelled off smoothly with cement mortar ¾ inch thick; the composition being 1 part of Portland cement to 2 parts clean sharp sand.

The contract price for the construction of the tank, including the removal of the excavated material from the Gas Company's land, was £23,659 15s. 6d.; but a subsequent arrangement was made by which the contractor rented a portion of the ground from the Company, and deposited thereon a portion of the excavated clay, which he is now working into bricks for the open market. The time allowed to the contractor for the complete construction of the tank was eleven months; but this was unfortunately considerably exceeded. The tank, when filled to its proper height, contains 7½ million gallons of water. About 87,000 tons of clay were excavated; and 16,400 tons of concrete were used. No extras were claimed or allowed.

Turning to the holder itself, Mr. Gibb said the main factors to be considered in designing a holder and guide-framing to meet requirements are: (1) Should the framing run the full height of the extended holder, or stop short at the second lift, allowing the top lift to rise above it? Some holders are seen which are constructed in the latter way; but they are generally cases where the holders have been enlarged, and the existing framing (much too strong originally) has been utilized, and made to do more resistive work than when first erected. In a new piece of work, next to nothing in first cost is to be gained by the shortening of the framing, and the projecting lift would probably have a much shorter life from the greater and more variable strains which would be put upon its structure. (2) What material should be employed? At the present time, it was not difficult to decide upon mild steel as the principal material; wrought-iron being used in special cases requiring welding, and for rivets. The clause in the specification relating to the material is as follows: "Except where otherwise specified, the gasholder and guide-framing will be constructed throughout of Siemens-Martin mild steel, capable of sustaining a tensile strain of from 28 to 32 tons per square inch of section, with an elongation of 20 per cent. in 8 inches. The wrought iron used must be of such quality as shall be capable of sustaining a tensile strain of 22 tons per square inch of section, with an elongation of not less than 10 per cent. in 8 inches. The rivet-iron must be capable of sustaining a tensile strain of 26 tons per square inch of section, with an elongation of not less than 12 per cent. in 8 inches. The rolled joists and channels must all be of English manufacture, as no foreign material of any description will be allowed to be used."

A drawing was here exhibited showing the outline of one side of the floating bell when this is up to its full height; the bottom edge rising to within 1 foot of the top level of the tank. This gives the bottom edge a seal, without that made by the gas pressure, of 6 inches in the tank water. Another drawing showed the arrangement of the framework; and it was pointed out by Mr. Gibb that the five bottom rings of the horizontal lattice girders are connected with their greatest depth towards the centre of the tank. This, he said, is, of course, the correct position for them, since the strains they have to withstand come from the side pressure of the floating bell. The top ring of girders is, however, turned the opposite way, in order to get a strong enough connection between the ends of the girders and the top of the standard. It is also possible that the exhibition from a distance of the lattice work of the top girder makes the design in better balance, though in gasholder work it is not necessary to consider ornament or appearance, since it may be taken that a gasholder is not under any circumstances "a thing of beauty." It may, however, be conceded that a framework built in steel is better than the old design of cast-iron columns finished on the top with extraordinary looking cast-iron vases from which equally extraordinary looking cast-iron Cactus plants appear to be growing.

Attention was next directed to the details of the standards, the lattice girders, the guiding arrangements, and the methods of telescoping. This brought the author to the sheeting of the floating bell. The crown sheeting, when the holder is floating, is, he explained, quite unsupported by any structural work, but is, on the other hand, amply supported by the gas pressure from within, and by the dome shape in which it is built—the crown having a rise of 20 feet in the centre. As to the side sheeting, where the channel-guides are attached, a continuous and thicker plate is run between the thick plates at the top and bottom; and upon this the channel-guides are riveted—the intermediate bays being then filled in with thin sheeting. The older method, he pointed out, was to simply attach the channel-guides to the thin sheeting; but it was found in practice that the heavier riveting required for the guides had not a sufficient attachment to the thin sheeting, and that they gradually broke away from it. In the present case, by the employment of $\frac{1}{4}$-inch plates, the heavy riveting on the channel-guides is securely attached to these; and the plates are still sufficiently thin to enable the thinner intermediate sheets to be securely riveted to them by the usual rivets employed in gasholder work—$\frac{5}{16}$-inch at 1-inch pitch.

The contract price for the structural steel work was £51,997. The total weight of metal was 2628 tons. The time allowed for the complete erection was eleven months; but this time was—as in the case of the tank—unfortunately considerably exceeded. The distance from the crown of the holder when up to the ground level is 148 feet, and to the bottom of the tank from the crown 193 feet. No extras were claimed or allowed. It should be mentioned that unfortunately the contracts had to be let at the height of the last boom, when the prices of both labour and material were very high.

The holder gives a water pressure of $4\frac{1}{2}$ inches by its inner lift, increasing to $7\frac{1}{2}$ inches when the intermediate lift is in action, and again increasing to $9\frac{3}{4}$ inches when all three lifts are clear of the tank rests.

These are only a few points of Mr. Gibb's paper, which necessarily had to be written in a style suitable for students, the majority of whom are inexperienced in this particular branch of engineering. By numerous lantern-slides of drawings and other illustrations, the author elucidated the progress of the work step by step from the trench for the tank walls to the finished holder. The remarks which followed the paper showed the great appreciation of those present.

Correction.—In the references to the Australian gas-works rating appeal in the "JOURNAL" last week, there was a repetition of an error in describing Mr. Philip C. Holmes Hunt as Mr. Percy C. Holmes Hunt. Of course, all his friends would recognize this as a mistake.

Bacterial Treatment of London Sewage.—We have received from the Clerk to the London County Council (Mr. G. L. Gomme) "The Experimental Bacterial Treatment of London Sewage." The volume contains an account of the experiments carried out under the auspices of the Council between the years 1892 and 1903, first by Mr. W. J. Dibdin, in his capacity of Chemist to the Council, and afterwards by his successor in that office, Dr. Frank Clowes, F.I.C., and Dr. A. C. Houston, M.B. The matter is arranged in three divisions. In the first, the chemical and general portion of the subject is dealt with by Dr. Clowes; in the second, Dr. Houston takes up bacteriological matters; and the third is devoted to an account of the bacterial work at various centres. These divisions are followed by an appendix furnishing additional information obtained by the experimental work carried out by the chemical staff of the Council. The chief interest of the volume for "JOURNAL" readers lies in the chapters dealing with the treatment of the sewage in coke-beds, to which reference has at times been made in our columns. The book must have been a costly production, as the text contains a large quantity of tabular matter, and is illustrated by a number of plates. But its contents are invaluable to all who are interested in the important branch of sanitary science dealt with by the authors.

YORKSHIRE JUNIOR GAS ASSOCIATION.

Gas and Ventilation.

The Monthly Meeting of this Association was held in Leeds, on Saturday, when a large number of the members spent a pleasant and profitable afternoon in inspecting the New Wortley works of the Leeds Corporation, under the guidance of Mr. R. N. Webb, who has been in temporary charge of the works since Mr. Bond's removal to Southport. Special interest was, of course, manifested in the installation of inclined retorts which Messrs. Graham, Morton, and Co. have in hand, and in the plant for making bricks from spent lime and clinker. Specimens of the bricks were very narrowly scrutinized, and many questions were asked concerning them. The fittings and arrangements of the old retort-house were closely examined and freely discussed, as many of the visitors saw the Arrol-Foulis stoking machinery for the first time.

At the close of the visit, cordial votes of thanks to Mr. R. H. Townsley, the General Manager, and Mr. Webb, the guide of the party, were accorded, on the proposition of the PRESIDENT, seconded by Mr. TURNER, senr., of Mirfield.

After tea, the members assembled in the Lecture Theatre of the Leeds Institute, under the chairmanship of the PRESIDENT (Mr. W. Cranfield), to hear a paper on "Gas and Ventilation," by Mr. J. H. HILL, of York.

In the course of his communication, the author remarked that ventilation was quite a science in itself, and required the study of a lifetime to properly master all its intricacies. Even then, it would be next to impossible now-a-days to keep pace with new discoveries and adaptations; for, as in other departments of science, important facts were added yearly, and its endless theories were equally subject to continual modifications. Hence, not only at each new generation, but at every fresh decade—nay, almost year by year—the matter of ventilation had to be reconsidered; and especially in relation to gas. The recent advances in the application of gaseous fuel to the production of light and heat marked the present as a most opportune time for an investigation into the relation of these improvements to the vitally important subject of ventilation. The charges which electricians continued to urge against gas as a deadly foe to hygiene, by reason of its inevitable accompaniments of fumes, in such dire contrast to the presumed healthiness of fumeless electricity, made it still more imperative for gasmen to get at the real facts and to let the truth be known. The public were familiar enough with the long catalogue of woes laid at the door of gas; but looking over the files of gas papers, he found little had been published lately in its defence against these wholesale denunciations. About ten years ago—at Belfast, in 1893—Professor Vivian B. Lewes spoke with no uncertain sound in vindication of gaseous illumination; and what he then urged told with much greater force on many important points to-day. In 1902, Professor Percy Frankland made some tests and comparisons between the effects of gas and electricity on the atmosphere in the Birmingham Corporation Art Galleries. On both occasions when incandescent gas was used there was a diminution of carbonic acid; and on the first, this took place notwithstanding the contribution of carbonic acid to the air by an exceptionally large number of visitors who attended the gallery on the market day. His report concluded thus: "The explanation of this diminution is not far to seek; it being obviously due to the more efficient ventilation of the gallery, which is caused by the great draught of heated air through the shafts. In my opinion, therefore, the incandescent gas installation is to be preferred to the arc lamps, which are much less effective in promoting ventilation."

Mr. Hill then went on to refer at length to the first report of the Home Office Committee on the Ventilation of Factories, &c., issued in 1902—and which was fully noticed in the "JOURNAL" at the time*—as being an up-to-date official declaration on the relations of gas to ventilation generally.. In it, he said, there was much to cheer the purveyors of gas; for while the report was a judicial document, giving the results of numerous tests in fairly unbiassed language, the recommendations resulting from a due consideration of the facts were not, on the whole, condemnatory of gas as a lighting agent. The first important admission was that, "while health depends on a constant and abundant supply of fresh air, it is an impossibility to keep the air of a building containing human beings absolutely pure. All that can be demanded is that the air to be breathed should be kept as pure as is reasonably practicable." The criterion of the sufficiency of ventilation adopted by the Committee in their investigations was the usually recognized one of the proportion of carbonic acid present in the air; but of this criterion Professor Lewes, in 1893, said: "It is by no means an accurate index of the absolute action of vitiated air upon health, although it affords a rough-and-ready indication, which is sufficiently near the truth for ordinary purposes." Much seemed to depend upon the source of carbonic acid and its concomitant circumstances. A singular fatality occurred in 1902 at the Dartford Gas-Works, which served to enhance the measure of uncertainty surrounding the problem of the part carbonic acid played in foul air. A stoker descended into the stoke-hole with a lamp in his hand. The lamp continued to burn; but the man

* See Vol. LXXX., pp. 1266, 1398, 1682.

was found dead—poisoned by the amount of stagnant carbonic acid present in the confined air. Yet analysis showed the percentage was only 8 parts in 10,000. His idea was that a smaller proportion of carbonic acid, if cold, is more harmful to life than a great percentage when warm.

Luckily, air-tight apartments were rare. Pettenkofer proved that in all rooms with chimney openings, a certain amount of exchange of air occurred through the walls, roof, floor, and various chinks. Even if the door and windows were closed tightly, there was still a brisk draught up the chimney—in fact, with every visible crevice and chink plugged up, Pettenkofer found the rate of ingress only diminished 28 per cent., as compared with the rate before the chinks were thus sealed up. In a room of 1400 cubic feet, no less than 4450 cubic feet per hour passed through the walls and up the chimney. Professor Lewes experimentally determined the atmospheric condition of an ordinary sitting room, 12 ft. by 16 ft. by 12 ft. high, lighted by three flat-flame gas-burners (consuming about 7 feet per hour each), and with two people in the room. At the end of five hours, the gas would have produced about 50 cubic feet of carbonic acid, and the occupants 6 cubic feet—making 56 cubic feet, or 2·5 per cent. of the 2300 cubic feet of air the room contained. But what was the actual result? The Professor found only an average of 0·18 per cent. of carbonic acid in excess, or $\frac{1}{14}$th of the gas evolved; showing that the total air of the room had been changed about fourteen times during the five hours. Yet there were no special means of ventilation other than those supplied by the usual door and window (which were kept closed) and the open fire-place. What now-a-days would the effect be when in a similar room, to get the some amount of light, only 2 or 3 feet of gas would be burnt?

Several most interesting experiments were made by the Departmental Committee on the Use of Water Gas, in 1899, in order to determine the rate of natural ventilation in rooms without any special inlets or outlets—some even without fire-place openings. The results of these tests showed "that in small rooms—say, 14 ft. by 14 ft. by 10 ft.—with two occupants, the ventilation through walls and ceilings and up the chimney may often be sufficient without open windows, or other special means of ventilation." His own experience had been that, in such a case, the walls must be papered, or, at any rate, not painted; otherwise they became impervious. A painted kitchen in a house in which he lived was made almost air-tight by closing chinks to exclude draughts, until the fire could not get air enough to keep it burning. The air whistled as it whizzed through the keyhole. Special inlets had to be provided conveying air to the fire-place; and yet the room was not stuffy when one gas-light was burning, as diffusion rapidly took place through the porous plaster of the ceiling.

Mention of draughts reminded him that churches and lofty rooms suffered seriously, when electric lighting was introduced, from this disagreeable, if not dangerous, condition of things. The cold upper layer of air fell down on the heads of an audience continuously. A chapel in York was so bad that one member told him he got a cold every time he went since the gas was superseded by electricity.

The part which temperature played, in conjunction with aqueous vapour, in affecting health, was a matter for mere speculation, since, so far as he knew, no one had made it an object of exact determination. Professor Lewes very carefully investigated the effect of moisture and heat on flames, and came to the conclusion that it was the degree of saturation, and not the actual amount of vapour per cubic foot of air, which acted powerfully upon the temperature, and therefore upon the light that was emitted by the flame. Mr. Hill said he imagined much the same result arose with human beings. Dry warm air was better than hot humid air. The vapour given off in breathing was not hot enough to ensure a low degree of saturation; while the addition of the heated products from gas burning overhead not only helped to keep the accompanying vapour in suspension, but assisted to take up other moisture, as the degree of saturation was small and the heated air was greedy for water. In this way, ventilation was assisted; vitiated vapour being diffused along with the non-toxic moisture. The complaint of dryness when gas-fires were used is due to want of ventilation often caused by closing up chimney openings—a reprehensible proceeding at all times. The makers of gas-fires were to be commended for having at last put into their hands the healthy, economical register or basket form of fire. This was specially suitable for bedrooms and sitting-rooms, as it fitted on to the hearth or bottom grate, and left the chimney-flue open. When alight, it accelerated the draught as much as a coal or coke fire. Sometimes, on first lighting, a down-draught drove the fumes into the rooms; but this would generally be overcome by first shutting the room door, so as to stop the suction from other flues in the house, and then, after a minute or so, if the door was quickly opened and closed again, a lead might be given to the up-draught, and no further trouble experienced. An obstinate flue could be cured by means of a moveable gauze wire screen in front and above the fire.

Referring to the question of dust in atmospheric air, Mr. Hill remarked that bricks and mortar were admirable sieves for admitting screened air, just as plaster ceilings sifted the motes out of outgoing air. Where the joists above the plaster prevented any air percolating through, the ceiling would be comparatively clear from discoloration. It was, he added, well to arm oneself with illustrations of this feature in places where gas was never used. There was a striking example in the York New Law Courts, the ceiling of which got disgracefully dirty, and lined with less striking patches where the rafters came, until the painters and decorators had to be called in to make the place respectable again. Yet not a foot of gas had ever been burnt in the building. It was true that up-currents of heated air from gas-burners, especially those with chimneys, concentrated the dust particles into a continuous stream, striking the ceiling directly above and causing an extra dark patch there. Perdifumes and heat diffusers innumerable had been tried, with but little success. The advent of the small inverted "Bijou" burner, consuming 1 cubic foot per hour, and giving a better light than a 16-candle power electric bulb, enabled them to appreciably reduce this, and, indeed, all other objectionable features erroneously attributed to gas lighting. The light given off by a "Bijou" burner was sufficient for a cottage kitchen or fair-sized sitting-room, and the accompanying heat, moisture, and carbonic acid were small. The arrangement of two or three of these, on small tubed centre pendants, gave a nice illuminative effect in a large room—far outshining electric lighting. He had dseigned a sliding pendant, with $\frac{1}{4}$-inch rubber tubing, which enabled a "Bijou" burner to be brought close to a workman's bench and then be pushed out of headway when not in use.

Returning to the question of dust in town air, Dr. Aitken, in 1888, made elaborate tests, and found in—

Outside air, after rain. . . .	521,000	Dust particles per cubic inch.
when dry . . .	2,119,000	,, ,,
Inside air, 4 ft. from floor . .	30,318,000	,, ,,
near ceiling . . .	88,346,000	A number equal to the population of Great Britain.
over a gas-burner .	489,000,000	Equal to the whole population of the world.

Mr. Hill said he had already explained the cause of this concentration of dusty motes above a gas-light; but it might be objected that unconsumed carbon was greatly responsible. It went without saying that even modern methods of consuming gas needed care. All burners were apt to get choked in time by dust; and unless properly attended to, incomplete combustion took place. The weak point about atmospheric burners was "lighting-back;" but this seldom occurred in the hands of sensible users, as they kept the gas jets and gauzes clean.

Turning his attention more particularly to soot, the author pointed out that Sir George Livesey had recently said: "Gaseous fuel is the cure of the smoke nuisance." Ventilation, then, had much to thank gas for. The greatest material curse of cities was coal smoke. There were always traces of sulphur and ammonia compounds in town air, as well as dust and soot; and this led him again to revert to Professor Lewes's 1893 lecture. Referring to the alleged rotting action of air upon the bindings of books, in the upper parts of rooms where gas was used, he said: "The results which have been observed are a great deal more dependent upon the sulphur dioxide which is found in all town air than upon the minute quantities produced by gas." He then went on to show that in a library the highly-heated dry air during the evening desiccated the leather. Then the room became colder and colder as the night went on and the fire died down, until, towards morning, the air got nearly to the point of saturation. The leather during this period re-absorbed the amount of moisture it had previously parted with, and along with this, traces of sulphur dioxide brought in by air from outside. This action, repeated night after night, resulted in sufficient sulphur impregnating the leather to produce rot. Ventilation, which carried off other gas products, must also dissipate any minute quantity of sulphur dioxide formed along with them. Plants and birds were doubtless killed through alternations of a dry and a moist atmosphere by a similar process. A bird shop in York was kept warm night and day by a syphon stove; and several bootshops also used these appliances.

The author concluded as follows: Taking for granted that the gas sent out from modern gasholders is properly purified, and that the latest and most approved means of burning it are employed, let us compare the products of a cubic foot of gas with what a man expires. Each cubic foot of gas will yield on complete combustion 0·54 cubic foot of carbonic acid; being about half what a man gives off per hour. The vapour produced and oxygen consumed are nearly equal in the two cases. It follows that the heat will be approximately the same also. A cubic foot of gas would raise 1300 cubic feet of air through 30° Fahr.; but being consumed overhead, and the heat more concentrated in space, the diffusive effect is far more pronounced than the heat from the human body.

I do not propose to enter upon a discussion of the relative merits of ventilation systems—natural, mechanical, plenum, vacuum, or otherwise. I may say, however, you seldom find any mechanical method in favour for a long period. However effective when first tried, they invariably prove failures. My purpose is accomplished when I have shown that any system may find in gas a valuable handmaid. Supposing, for instance, in a room of 2400 cubic feet capacity, four persons are seated on a winter's evening, and that, by means of a good fire burning gaseous fuel the whole air is changed four times per hour. A No. 2 Kern burner, or two "Bijou" burners, giving ample light in the room, and consuming 2·25 cubic feet, would only add 1·25 cubic feet of carbonic acid per hour. Doctors now are generally agreed that human breath impurities require proportionately more fresh air dilution than the comparatively innocous gas products; hence a further 1000 cubic feet or so of air is all that would be requisite, and much more than this would really be induced to enter by the

heated up-currents from the light. Besides, it must not be overlooked that no other lighting agent—electricity, candles, or oil—can at all compare with incandescent gas in this regard.

It is not our business to provide means of ventilation; this can only be done by architects. Ventilating gas-pendants and extracting shafts are to be had by those who want them. The wise part for us, who are continually brought into contact with defective or deficient methods of air scavenging, is to acquaint ourselves with correct principles, and push them whenever we can. I was glad to see Mr. T. G. Marsh was lecturing the Society of Architects quite recently.* The objections raised against warming by gas in the discussion which followed are met by the register fire, as I have pointed out; and we must urge architects and doctors to recommend its use. The undoubted advantages are so manifest that gas cooking is sure to continue to increase. Rightly viewed, gas may be a great help in the attainment of healthy homes and haunts everywhere, and thus it will indirectly contribute to the success of commercial life, which depends so much upon the health of those engaged in it.

Discussion.

Mr. J. F. SMITH (Halifax) asked what ground Mr. Hill had for stating that the "Bijou" inverted burner enabled them to appreciably reduce the up-currents of heated air from the gas-flame, and the consequent formation of a black patch on the ceiling. He looked with considerable suspicion on these attempts to circumvent Nature. A flame naturally tended to rise, while the flash of an explosion struck down through a mixture of gases; and though there were advantages in the direction of greater comfort, more equable diffusion of light, and absence of shadows below the burner, yet his experience made him doubt their healthiness, inasmuch as he frequently noticed from these inverted flames a smell which indicated the escape of partly burned gas, &c. He proceeded to give particulars of instances he had recently investigated, where analyses of the air of buildings showed the efficiency of the ventilation of certain gas-lighted rooms, where due advantage had been taken of the convection currents arising from the gas-flames, and deprecated the fact that architects so frequently omitted to utilize this assistance to the removal of air from buildings.

Mr. HILL stated that his experience of inverted incandescent burners was practically confined to the "Bijou" burners. From these he had not detected any signs of the pollution of the air by products of incomplete combustion. Their smaller production of blackened ceilings was due to their smaller gas consumption, and consequent less heat production and current formation.

An animated conversation on the fitting of gas-stoves in bedrooms, what kinds were preferable, and how far the chimney opening should be constricted, was then maintained by Mr. G. FLIGG (Dewsbury), Mr. HORSNALL (Normanton), Mr. W. N. BOOTH (Halifax), Mr. M'NAB (Bradford), and Mr. HILL, in the course of which the speakers freely quoted their own experiences of stoves, and their users and abusers.

Mr. A. S. BROOK (Ossett) begged Mr. Hill and others for guidance in convincing customers that blackened ceilings, &c., had sometimes but little to do with gas, and were the result of air currents and the filtering of air through porous plaster.

The PRESIDENT, in closing the discussion, urged that in this case the most effective method of defence was a vigorous attack, as the harm done by air polluted by the products of gas combustion was probably insignificant in most cases, compared with the ravages of air fouled by the organic emanations from lungs and skins. Mr. Hill had doubted the existence of much evidence of the harm effected by bad air; but there was plenty in the official reports on the gradual amelioration of the atmospheric and sanitary conditions in the barracks, war-ships, and prisons in various parts of the empire during the last century. Evidence of the most luridly convincing type had thus accumulated—seeing that formerly these places were often phenomenally bad. He, like Mr. Hill, had had to investigate cases of cold down-draughts in chapels where electricity had displaced gas, and had found it arose from cold winds beating against the clerestory windows, chilling the air near the glass, and creating downward cold currents. Gas-lighting wisely arranged would obviate much of this, which otherwise must be dealt with by double windows or by a series of hot-water pipes round the upper parts of the building. Many public buildings suffered from want of atmospheric flushing when empty, and perhaps places of worship most of all. He had once found the amount of carbonic acid in a chapel double what it should be, before the Sunday morning service began, and frequently higher than that just before the evening service; while he had discovered in one such building as much as 0·35 per cent. of carbonic acid at the end of an ordinary evening service, and concluded that this would be a usual occurrence there. In this case, owing to ludicrously inadequate ventilation, gas had to bear part of the blame. Mr. Hill's condemnation of mechanical ventilation was too sweeping and reckless. These systems were often the only means of meeting such sudden emergencies as occurred in large public buildings; and he had had to report on some which were eventually highly successful. They, however, needed brains in their conception, in their construction, and more especially in their using. He suggested that the case of poisoning in a stoke-hole at Dartford would probably be found to have been caused by carbonic oxide.

* See "JOURNAL," Vol. LXXXV., p. 772.

THE SCOTTISH JUNIOR GAS ASSOCIATION.

Formation of a Western Branch.

A Meeting of intending members of the Junior Gas Association for Scotland, called by Mr. James Lowe, Assoc.M.Inst.C.E., of Glasgow, was held in the Glasgow and West of Scotland Technical College, Bath Street, last Saturday evening. Upwards of a hundred gentlemen were present; among them being Mr. Alex. Wilson, the Gas Engineer to the Glasgow Corporation, Mr. W. M'Crae (Falkirk), Mr. L. Hislop (Uddingston), Mr. J. Napier Myers (Saltcoats), Mr. T. Lighbody (Renfrew), Mr. J. W. Carmichael (Barrhead), Mr. W. Blair (Helensburgh), Mr. R. L. Deans (Johnstone), and Mr. H. O'Connor (Edinburgh).

Mr. WILSON was invited to take the chair.

The CHAIRMAN said it gave him great pleasure to preside. The formation of a Junior Gas Association, or some similar Association, for Scotland, had been for a long time in his mind. Certainly, they wanted to give the credit for setting the ball rolling to Mr. J. Dickson, of Broughty Ferry, who had put them all on their mettle to get the thing started. He had the pleasure of being at a meeting in Edinburgh, called by Mr. O'Connor, in connection with the class in "Gas Manufacture" which he held (*ante*, p. 226); and it delighted him very much that in the East they looked upon the matter very much in the same way as they did in the West, and favoured the formation of an Association for the whole of Scotland. Of course, the proposals made on that occasion did not bind them in any way; and they would have to take the question into consideration for themselves, because, though the seniors wanted to start the Association on its way, they did not wish to dictate to them, or to force their hands. They simply desired to give the Association a good send-off. Mr. Lowe, when the matter was mentioned to him, took it up very heartily. He had done most of the work, and therefore he ought to have most of the honour.

Mr. LOWE said he had letters of apology for absence from Mr. A. Smith, of the Tradeston Gas-Works, who wrote that he was sorry he could not be present, but that they might depend upon his doing what he could to help the Association; from Mr. J. M'Gilchrist, of Dumbarton, who wrote that he regretted being unable to accept the invitation, and trusted they would have a successful meeting; and from Mr. M'Lusky, of Perth, who wrote that he was mustering the Perth contingent for the meeting, and that they might expect five or six members from the works and distribution departments combined. The Chairman had been having correspondence with Mr. W. R. Herring, who, in the course of it, wrote:—

> I am of opinion that juniors in shale oil works and kindred industries should be eligible for membership in the Junior Gas Association, as I am of opinion that there is a great deal of the every-day practice in those industries which would be profitable information for those engaged in gas-works. I also think that any young fellow training as an engineer in other than gas-works should be eligible for membership. It appears to me that it is only by this means that we can get the right class of men to recruit the ranks of gas engineers. From an engineering point of view, the structures are so diverse and complicated that it is almost impossible for a young fellow brought up in a gas-works to be a really successful gas engineer. One thing, however, must be guarded against, and that is so-called trading influences. It may be necessary to carefully provide some system of veto, to prevent the election of such parties as would use the Association for purposes other than those for which it is intended. The internal management, I think, should be very much left in the hands of the juniors themselves.

Mr. Herring went on to suggest that the Association might be encouraged to visit works, so that, in the course of a year, they might have devoted a separate afternoon, for example, to each important section forming a whole manufacturing process. They had, continued Mr. Lowe, already considered some of the points Mr. Herring had noted; and in the draft of the rules to be submitted, they had embodied several of the suggestions he made before they received them. He thought Mr. Wilson's opinion and his own were in accord with what Mr. Herring had written.

The CHAIRMAN said they might take it that they were going to have the great sympathy and the active help of most of the seniors. Perhaps it might be advisable to hear what had been done in Edinburgh. Their friend Mr. O'Connor was present; and he might let them know what they had been doing.

Mr. O'CONNOR said that the meeting which he called in Edinburgh was not nearly so largely attended as that one. He called it because a number of his own students had approached him in the matter of starting something of the kind. At the meeting, they appointed an interim Secretary, who had sent out a circular to a number of works in the district of which Edinburgh would be the centre. He believed there had been a fair number of replies; but until their next meeting there was really nothing tangible that could be done. Therefore they were really marking time until they settled their rules. He was very pleased indeed to hear Mr. Herring's letter read. On the previous day, he spent some considerable time with Mr. Herring, talking over the subject of the Junior Gas Association; and one of the expressions he used was that a gas engineer's best chance of training was outside a gas-works. He thought it a somewhat peculiar expression to use; but Mr. Herring said the training a young man required now-a-days to become a gas engineer was not only that of a mechanical engineer, or a structural engineer, or a civil engineer, but he also

required to be a chemist. If a young man were ever to become a gas engineer, he must embody these three or four branches of the work; and while he was learning one it would be a pity if the others were closed to him, by his not being eligible to become a member of such an Association as that about to be formed.

The CHAIRMAN quite concurred in what Mr. Herring had said about the getting of men from the outside into the Association. He had much pleasure in proposing that they form a Junior Gas Association for Scotland, and that they there and then form a Western Branch. He did not think he need ask for a seconder, as he saw that the proposal was carried unanimously.

It was subsequently agreed that the name should be "The Scottish Junior Gas Association, Western District," and that the Association should consist of members and honorary members, the number of the latter never to exceed one-third the number of ordinary members.

The CHAIRMAN said the next item was the qualification for membership. He proposed that this should read: "Any person actively engaged in the manufacture or distribution of gas, or in the manufacture of oil from shale, or in the recovery and working up of residual products from these and kindred works, or at present being trained as an engineer with the intention of being engaged in any of these industries." This threw the net pretty wide, while giving the Council quite a free hand in keeping out what was called the trading element.

Mr. J. NAPIER MYERS seconded. He said he was very pleased to be there to lend any help he could. The Chairman and Mr. Lowe had been very successful in drafting the rule just read. It was extremely desirable that the Association should exist for technical purposes, should assist members in their chemical and engineering knowledge, and should not partake in any way of a trading or political society.

Mr. LOWE pointed out that coal gas was not mentioned specifically; and he explained that this had been done advisedly, because they wanted to let in any person who might be engaged in the manufacture or distribution of Mond gas, or any other system of gas supply that might not as yet have been developed in Scotland. The rule would also admit those who worked up the residuals from coke-ovens and blast-furnaces gases as well as those engaged in the shale oil industry.

Mr. W. M. MASON (Glasgow) asked whether clerks who were engaged in gas-works would be eligible for membership.

Mr. BLAIR thought the word "distribution" would cover that.

Mr. LOWE said it was the intention that it should do so.

The CHAIRMAN did not see why they should debar clerks. They obtained a certain amount of training in connection with gas works, and the more they knew about the business the better they could discharge their duties. If a clerk were a smart fellow, he (the Chairman) did not see why he should not rise to be a gas manager as well as anybody else, if he applied himself to his work. Answering a question as to an age-limit, he added that the word "Junior" applied to the Association, and not to the members; and there would not be the slightest objection to any man on account of his age.

Mr. M'CRAE raised the question of whether young men who were being trained as carbonizing specialists, or those engaged in the manufacture of meters and gas plant generally, would be admitted. It would, he thought, be a pity to debar any one of these.

The CHAIRMAN remarked that the word "engineer" had a very wide meaning; and the same might be said of meter makers and those who were engaged in the manufacture of gauges and the like. In fact, they had used the word "engineer" specially to cover any tradesman who had a desire to work his way into the gas profession.

The motion was agreed to.

The CHAIRMAN said it was further proposed: "Honorary members to be elected at the discretion of the Council from persons associated with gas manufacture, but not engaged in the making of gas appliances, shall be eligible to take part in the reading of papers, discussions, &c., but not to hold office or to take part in any voting." This rule was taken entirely from the rules of the Southern District Junior Association; and it seemed to them to meet the case very well. They would not start with any honorary members; but after the first meeting of the Council it would be quite eligible for anyone to apply.

This was agreed to, as was also the following proposition: That "the objects of the Association shall be: (*a*) To devise means for helping and extending the technical knowledge of its members; (*b*) the reading of papers by members and others, and discussions thereon; (*c*) the delivery of lectures; (*d*) to hold conferences and meetings for the discussion of matters of general interest relating to the gas industry; (*e*) to form a library for the use of members; (*f*) to collect and publish records of events of service and interest to members; (*g*) to arrange excursions to works, &c." It was further decided that the subscription should be 5s. per annum; and other matters of detail were arranged.

Mr. LOWE suggested that the rules should be remitted to the Council, with power to make slight alterations in them, so as to secure uniformity with other districts; and this was agreed to.

Mr. O'CONNOR asked if the Councils to be elected by all the branches were intended to form the Council for the general meeting and other general business.

The CHAIRMAN replied that there would not be so many branches; and he thought it would be better to allow the Council and officers of each branch to be representative of the whole of Scotland.

The meeting then proceeded to the appointment of office-bearers; the result being as follows:—

President: Mr. Lowe.

Vice-President: Mr. John Barber, Technical Assistant, Greenock Corporation Gas-Works.

Hon. Secretary and Treasurer: Mr. W. M. Mason, No. 45, John Street, Glasgow.

Members of Council (three from Glasgow and three from outside districts): Messrs. D. S. Munn, Dawsholm; James Byres, Glasgow; George Watson, Dawsholm; James Bell, Airdrie; John M'Lusky, Renfrew; and Charles Fairweather, Kilmarnock.

The CHAIRMAN expressed pleasure that they had so harmoniously started this branch of the Association. He hoped it would be fully taken advantage of, and that they would see the results in years to come, both in the Junior Association and in the members of it who would be transferred from the Junior to the Senior Association. It was thought, he said, not so many years ago, that their industry was going to be snuffed out; but they all felt to-day that they had a greater future before them than was ever dreamt of before.

A GENTLEMAN suggested that the authorities of the Technical College should be approached with a view to starting a class in Gas Manufacture.

Mr. LOWE said the Council would be likely to look after that.

The CHAIRMAN explained that but for the want of room in the College, and other difficulties, a class would have been started last year.

A vote of thanks to the Chairman concluded the proceedings.

CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

The International Gas Exhibition at Earl's Court.

SIR,—I have noticed in your last issues communications from two correspondents signed respectively "Exhibitor" and "Hermit," in both of which it is suggested that representatives of the various classes of intending exhibitors should be invited to assist the Committee in organizing the International Gas Exhibition which it is proposed to hold at Earl's Court in November and December next. Perhaps you will allow me to say that this matter has not been lost sight of by those entrusted with the details of the scheme; and as they realize how useful the experience of the many practical men who would be included among such representatives would be to them, it is their intention to take some steps whereby the advantage of co-operation may be secured. Meanwhile, any suggestions as to how this can best be brought about will be gladly received and carefully considered by the Organizing Manager, Mr. W. F. Bridges, 119, Finsbury Pavement, E.C.

Croydon, May 6, 1904.

J. W. HELPS,
Hon. Sec. to the Advisory Committee.

Free Attention to Incandescent Burners.

SIR,—Referring to your note in the last issue of the "JOURNAL," on the adoption of free maintenance of incandescent burners, &c., by the Hampton Court Gas Company, I may say that my Company have been doing a similar thing in their districts for the past eighteen months, and I claim that, although the cost of the service has not been covered by the sale of mantles, &c., yet the Company have been very well repaid indirectly.

The frequent visits to the consumers enable us to remedy complaints as soon as the first symptoms appear, instead of waiting until they become sufficiently acute to lead the consumer to address a letter to us upon the subject. I estimate that the profit on mantles, &c., about pays half the men's wages, and the other half would be incurred in any case in attending to small complaints which the "maintenance men" are able to do.

Walton-on-Thames, May 7, 1904.

THOS. PRICE.

SIR,—You will see by the enclosed circular that this Company are proceeding on somewhat similar lines to those adopted by Mr. Price, of the Hampton Court Gas Company, with regard to incandescent burners. We previously had a maintenance system, and have substituted free attendance in place of it. We only began on the 1st of April; and therefore have hardly had sufficient experience to say much about it.

Malton, May 7, 1904.

HENRY TOBEY.

[CIRCULAR ENCLOSED.]

ATTENDANCE GRATIS.

To commence April 1st, 1904.

The Directors of the Malton Gas Company, recognizing the great superiority of incandescent gas lighting both in brilliancy and cost over all other methods of illumination, desire to promote its adoption. It is found that, from want of proper adjustment or from dust getting into the burners, the light given by them becomes dim and unsatisfactory, and the consumer disgusted. The Directors have therefore decided to appoint an inspector to attend free of charge at consumers' premises, on request, to clean, adjust,

and put the burners into an efficient condition, and to see generally to the consumers' requirements.

Requests for attention should be sent (early in the day) either by messenger, telephone (No. 21), or by post.

New mantles, burners, chimneys, globes, &c., supplied at current prices. No charge will be made for fixing.

[In a letter referring to business matters, Mr. C. E. BOTLEY, of Hastings, incidentally calls attention to the fact that several years ago he adopted a similar system of free cleaning and attention to incandescent burners. The circular which he sent out when the Company initiated the system, is alluded to in a paragraph on p. 364.]

REGISTER OF PATENTS.

Manufacturing Lime and Fuel Gas.—Pearson R., of Redcross Street, E.C. No. 10,624; May 9, 1903.

This invention relates to a process for the concurrent manufacture of fuel gas and lime,* and consists primarily in the industrial utilization of certain chemical reactions wherein carbon monoxide is produced from carbon dioxide by treating limestone chalk or other suitable earthy carbonate in a kiln (as in ordinary lime making), and passing all the disengaged gases or products of combustion over or through heated converters charged with carbon or carbonaceous substances, with the result that each molecule of the disengaged carbon dioxide gives up one atom of oxygen to the carbon-forming two molecules of carbon monoxide. In order to hasten the disengagement of the carbon dioxide, the patentee finds it advantageous to introduce steam into the kiln, which also enables the consumption of carbon in the kiln to be lessened.

In the lime burning part of the process, it is desirable to use as little fuel as practicable, so as to obtain a gas in which the ratio of carbon dioxide to nitrogen shall be as high as is consistent with effective burning, and so that the resulting lime shall be free in a corresponding degree from ash and clinker. The gases from the lime burning are passed through converters, which, following the practice in the production of water gas, have been blown up to a high temperature and in which the carbon dioxide is largely converted into carbon monoxide. In the event of steam being used as above mentioned, it passes almost unaltered from the kiln along with the carbon dioxide, and is converted into water gas. Both conversions cool the fuel in the converter, which therefore requires to be blown up at such intervals as may be found necessary. The gases, however, produced in the blow must not, the patentee points out, be allowed to mix with the converted gases already referred to.

This combination of the two operations of lime burning and fuel-gas making (among other advantages), it is said, permits of the introduction of an important economical feature, since not only is the gas from the lime burning already at the temperature of a red heat or thereabouts when it enters the converters, but the whole of the waste heat produced in each part of the process is rendered "most conveniently available for the preliminary heating of the materials employed in the same or in some other part of the combined process."

Fig. 1.

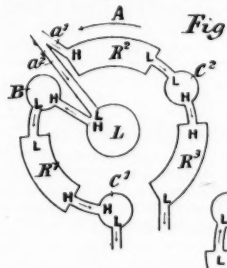


Fig. 2.

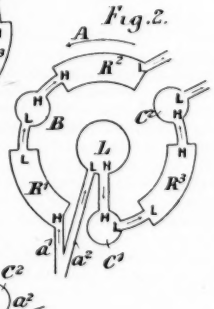
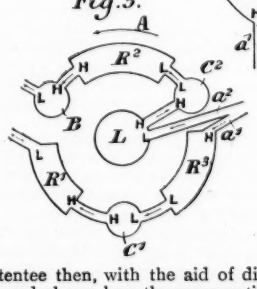


Fig. 3.



The patentee then, with the aid of diagrams, describes the whole operation, and shows how the regeneration of the heat may be "very perfectly effected." The diagrams illustrate a triple-converter plant; figs. 1, 2, and 3 respectively showing the connections as they would be made at the three successive stages of the complete cycle of operations of such a plant. The letters H and L respectively denote that the connections between the several chambers forming the converters and regenerators are made at a high or at a low level as the case may be.

In the diagrams, the circle L represents the lime-kiln. B, C^1, and C^2 are three converters containing incandescent fuel; and R^1, R^2, R^3 three chambers filled with chequer brickwork to serve as regenerators. The converters and regenerators are arranged in alternate order around the kiln, and the whole is enclosed to prevent loss of heat by radiation.

* A reference to this patent appears in the leader columns to-day, p. 365.

The top opening of the lime-kiln should be surmounted by a shoot, for feeding the mixture of chalk or limestone and fuel to the kiln; this shoot being surmounted by a second shoot provided with a distributing spout to supply the charge of fuel to the three converters. The arrangement is such that the materials in their passage through the two shoots (the "chalk shoot" and the "coke shoot") may be heated by waste heat, as will be presently described.

Referring, now, to fig. 2, let it be supposed that the apparatus is in work, and that converter B has just lost some of its heat in the process of conversion, and is ready to be blown up or re-heated. To enable this to be done, the connections with chamber B are made as shown—that is to say, warmed air, drawn by means of a fan from the enclosed space surrounding the chambers, is caused to enter at a^1 the regenerator R^1, which (in the immediately preceding stage of the cycle indicated in fig. 1) has just served the purpose now being performed by the regenerator R^3, and (as will appear) will therefore be at a good red heat, although not at the highest heat.

The air leaving the regenerator R^1 is caused to enter the converter B at a low level for an upward blow; and on leaving the converter B, it enters the regenerator R^2 at the upper part. The regenerator R^2, whose temperature has been reduced to its lowest point (having just previously performed the part now performed by R^1), is brought again to the highest temperature by these hot blow-gases, which thus lose part of their heat. The blow-gases on leaving R^2 may be divided into two portions, which are respectively caused to pass up through the materials in the chalk and coke shoots; so that these materials will not only be dried, but their lower strata may even be brought nearly to a red heat before entering the kiln or converters as the case may be. The blow-gases, instead of passing directly to the shoots, may be caused to superheat the steam injected into the kiln, by being passed around the tubes of a superheater for the said steam. The blow-gases, after leaving the shoots, escape cool and without further value into the air.

In order to avoid loss of fuel and heat by the escape of carbon monoxide in the blow-gases, it may be necessary to divert some air from the regenerator R^1 into the converter B at a point above the coke, or into the regenerator R^2, as may be most convenient, so as to burn such escaping carbon monoxide, and thus enable its heat of combustion to be utilized.

The fuel-gas circuit begins at the kiln L, into which air, warmed in the space enclosing the apparatus, is driven in at a^2 by a fan or blowing engine, which may supply air both to a^1 and a^2. The air injected at a^2 enters the lime-kiln at the lower part, passes through the escaping lime, which it cools (and by which it is further heated), until it meets with the mixture of fuel and chalk where combustion sets in and a good red heat is attained, and where the carbon dioxide from the chalk and that formed by combustion mix. The escape of the carbon dioxide from the chalk is much facilitated by the introduction of steam, as already mentioned; this steam, superheated as far as practicable, being caused to enter the kiln at the level where the fuel is becoming exhausted and where the highest temperature in the kiln is to be found.

The hot mixed gases from the lime burning leave the kiln at the upper part, and enter the converter C^1 at a high level, passing downwards through C^1 and leaving at the lower part on their way to the regenerator R^3. Part of the gases from the kiln are converted into carbon monoxide and hydrogen in their passage through the converter C^1, which, however, is not hot enough to make the conversion as complete as practicable, having just previously been cooled somewhat by having served the purpose now performed by C^2, as will be described immediately. The converter C^1 will thus become a little cooler than the regenerator R^3; so that the partially converted gases will, in passing through the latter, be heated somewhat; and on entering the converter C^3 at the upper part, these gases will be nearly as hot as the converter C^3, and will thus cool C^2 mainly by the absorption of carbon therein, and will hardly waste any of the heat so absorbed by having their own temperature raised. The now completely converted gases leave C^2 at the lower part, and, carrying with them a large amount of sensible heat, pass to the point at which they are utilized. On the way thither, the hot gases may be made to pass through the boiler wherein the steam injected into the kiln is generated, and which may advantageously be of the water-tube type; the gases thereafter flowing around the water-supply tubes of an economizer. The gases, thus cooled and uncontaminated, are now available for storage or for use.

As soon as the converter C^2 has, in the operation of conversion, become cooled to a sufficient degree, the connections are changed as shown in fig. 3—C^2 taking the place of C^1, B of C^2, and C^1 of B; while corresponding changes occur in the functions of the regenerators. The arrow A indicates the direction in which the changes of the cycle progress. From this cycle, there result (the patentee points out) the advantages that the directions of flow, both in the converters and in the regenerators, are in reverse directions in the blow and in the make, and that preliminary warming is done by waste low temperature heat and heating at each stage by waste heat of only a moderately higher temperature—these being the conditions of greatest effectiveness.

From the combination of lime burning and fuel-gas manufacture, it is claimed that there results the advantage that the converter is fed with gases containing a larger proportion of carbon dioxide to nitrogen, and so the fuel gas can be made to contain a greater proportion of carbon monoxide to nitrogen (without reference to any water gas made) than is possible with any producer gas; and to this end "the adoption of the very perfect regeneration described assists by enabling the fuel in the lime-kiln to be kept down." The result is "not only lime with but very little ash mixed with it, but gas of higher calorific value than any of the well-known fuel gases, and inferior in this respect only to water gas and to coal gas among commercially produced gases."

Burner-Tips for Incandescent Gas Lighting.—Bray, J. W., of Leeds. No. 4824; Feb. 27, 1904.

This invention relates to the class of burner-tip described in patent No. 5215 of 1903, and has for its object the construction of a burner-tip of a plastic, non-corrosive material—such as potters clay or the

like—in such a manner that "the life of such burner-tip is materially prolonged, and a better and more economical light obtained than has hitherto been the case; also that by the use of such burner-tip lighting-back is prevented, be the flame high or low, without the aid of gauze immediately below such burner-tip."

The tip is of circular form (as shown), and has therein three circles of perforations substantially rectilineal in shape, but longer than wide. The perforations nearest the outer edge of the tip are longer than the adjacent perforations situate near the centre of the tip; the latter perforations being in turn longer than the next row again nearer the centre of the tip. The divisions of the rows of perforations "break joint," and radiate to the centre. By constructing the tip in this way, the wire gauze, hitherto inserted immediately underneath for the purpose of preventing lighting-back, may be dispensed with, and the flame of the burner may be turned down exceedingly low. For the purpose of carrying the mantle-rod, a boss is formed on the centre of the upper face of the tip having a hole through the centre. The hole may be taper in form or may have parallel walls, and is continued through the boss to another boss on the underside of the tip.

APPLICATIONS FOR LETTERS PATENT.

8880.—Graham, M., "Coke-ovens." April 18.
8891.—Bonella, J., "Gas-stoves." April 18.
8901.—Wakelin, J. F., Bunn, W., and Weston, C. J., "Gas-cocks." April 18.
8919.—Smyth, J. & J. F., "Acetylene generator." April 19.
8927.—Lambert, J. E., "Incandescent lamps." April 19.
8990.—Beduwé, J., Sen., "Separating moisture and oil from gas." April 19.
8993.—Poetter, H., "Gas-producer." April 19.
9012.—Dudgeon, A. J., "Gas-engines working on the four-stroke cycle." A communication from Société Anonyme John Cockerill and H. Savage. April 19.
9062.—Carey, A. B., "Gas-engines." April 20.
9142.—Southey, A. W., "Internal combustion engines." April 21.
9149.—Parsons, F. R., "Gas-washers." April 21.
9174.—Sheldrake, J. H., "Gas-apparatus." April 21.
9189.—Bennett, C. V., "Gas-lanterns." April 21.
9206.—Bernheim, J., and Wagner, M., "Purifying gas." April 21.
9230.—Appleyard, J., "Atmospheric burners." April 22.
9237.—Hackney, S. J. & G. F., Hulse, E. F., Oakes, J., and Jones, J., "Incandescent gas-lamps." April 22.
9241.—Richards, C. S. & G., "Rotary gas-motors." April 22.
9244.—Miller, F. J. & C. A., "Acetylene burners." April 22.
9284.—Ruud, E., "Atmospheric burners." April 22.
9327.—Crossley, W. J., and Atkinson, J., "Internal combustion engines." April 23.
9328.—Burley, J. D. C., and Gilmore, A. E., "Anti-vibrators." April 23.
9367.—Anderson, D., "Incandescent burners." April 23.
9376.—Bildt, C. W., "Gas-producers." April 23.
9396.—Reese, L. C., "Gas-producer." April 25.
9417.—Belliss and Morcom, Ltd., and Jude, A., "Gas-turbines." April 25.
9464.—Akester, W. H., and Paterson, W., "Mantles." April 25.
9467.—Boult, A. J., "Internal combustion engines." A communication from Ganz and Co. Eisengiesserei und Maschinenfabrik Actiengesellschaft. April 25.
9512.—Helps, G., "Gas manufacture." April 26.
9514.—Redman, T., "Purification of gas." April 26.
9524.—Belliss and Morcom, Ltd., and Jude, A., "Gas-turbines." April 26.
9532.—Dean, J. W., "Producing gas." April 26.
9602.—Thorp, T., "Rotary gas-meters." April 27.
9608.—Whitfield, C., "Gas-producer." April 27.
9622.—Crossley, E., "Incandescent 'metal' mantle." April 27.
9649.—Rudd, A., "Gas-brackets." April 27.
9668.—Lymn, A. H., "Gas-producers." April 27.
9685.—Alliance Industrielle Société Anonyme, "Gas-burners." April 27.
9721.—Hodge, D. S. & A. E., "Gasaliers." April 28.
9722.—The Electric Turbine Gas-Retort Charging and Discharging Machine Company, Ltd., and Chandler, S. & J., "Discharging gas-retorts." April 28.
9724.—Lambert, A. J., "Gas-griller burner." April 28.
9732.—Sonnenthal, G., "Drilling and tapping." A communication from The Fulton Foundry and Machine Company. April 28.
9747.—Noad, A. C., "Gas-lamps." April 28.
9755.—Nurnberg, A., "Gas-burners." April 28.
9824.—New, A. G., "Enriching gas." April 29.
9879.—Wakelin, W. J., Weston, C. J., and Bunn, W., "Control of gas-burners." April 29.
9942.—Boutillier, L., "Gas generating apparatus for producing poor gas free from tarry matters." April 30.

Mr. Edward Jeal, who has just retired from the service of the South-Eastern Railway Company after 47 years' work for them, is a striking proof of the statement lately made by the "Lancet" that gas-light is not by any means so injurious as some people try to make out. With the exception of seven years, the whole of Mr. Jeal's service was performed by this light in his office at the Hastings Station, where he was the chief booking clerk, and he was very seldom absent on account of illness.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The following further progress has been made with Bills:—

Bills read the first time, and referred to the Examiners: Barnet District Gas and Water Bill, Gas Orders Confirmation Bills (Nos. 1, 2, and 3), Gas and Water Orders Confirmation Bill, Water Orders Confirmation Bill.

Bills read a second time and committed: Amersham, Beaconsfield, and District Water Bill, Thurles Urban District Council Water Bill.

Bills reported: Bishop's Stortford and District Gas Bill, Blyth and Cowpen Gas Bill, Kirkby-in-Ashfield Urban District Gas Bill, Minehead Urban District Council Water Bill, Newcastle and Gateshead Water Bill, Preston Corporation Water Bill, Ryde Gas Bill, Sutton Gas Bill, Whitby Gas Bill.

Bills read the third time and passed: Bishop's Stortford and District Gas Bill, Chesterfield Gas and Water Board Bill, Harrogate Water-Works Tramroad Bill, Leeds Corporation (Water-Works) Railway Bill, Norwich Water Bill, Sutton Gas Bill, Wellington (Somerset) Gas Bill.

The Chippendale Gas Bill, the Sheppey Gas Bill, and the South Shields Gas Bill have been referred to a Select Committee, consisting of Lord Brougham and Vaux (Chairman), Earl Bathurst, Viscount Falmouth, Lord Aberdare, and Lord Clonbrock; to meet to-day.

Petitions have been presented by the Colney Hatch, Tamworth, and Watford Gas Companies against the Electric Lighting Provisional Orders (No. 2) Bill, containing Orders relating to Southgate, Tamworth, and Watford; and by the Maidenhead Gas Company against Bill No. 3, containing the Maidenhead (Extension) Order.

HOUSE OF COMMONS.

The following further progress has been made with Bills:—

Bills read the first time and referred to the Examiners: Local Government Provisional Orders (Gas) Bill, Chesterfield Gas and Water Board Bill [Lords], Ebbw Vale Urban District Water Bill [Lords], Harrogate Water-Works Tramroad Bill [Lords], Leeds Corporation (Water-Works) Railway Bill [Lords], Shipley Urban District Council Bill [Lords].

Bills reported: Brymbo Water Bill, Harlow and Sawbridgeworth Gas Bill, North-Western Electricity and Power Gas Bill.

Bills read the third time and passed: Barnet District Gas and Water Bill, Doncaster Corporation Bill, Huddersfield Corporation Act, 1902 (Amendment) Bill.

GLEANINGS FROM THE COMMITTEE ROOMS.

Anyone looking for gas measures last week could only have found them before the Unopposed Bills Committees; and among them there was not one the proceedings upon which yielded anything worth recording. But the happenings of this session have shown plainly that it will not do to neglect observation upon the doings of the Unopposed Bills Committees, and that promoters must not nurse themselves into a feeling of perfect security on all points of their Bills because of the fact that there is no outside opposition. It is anything but a perfunctory examination of the clauses that Lord Balfour of Burleigh's and Mr. Lowther's Committees have been giving to measures this session; and promoters have frequently seen important introductions and changes made between entering and leaving the presence of the one or the other Commttee. Among the experiences, it is found that agreements entered into with Local Authorities prior to the appearance of a Bill before these Committees must be made subject to all the clauses bearing upon an agreed one being carried through; otherwise promoters may find themselves in an inconvenient position. For instance, there is a case where a certain standard price was agreed with a Local Authority; the illuminating power of the gas being 13 candles. The illuminating power has been raised by a Committee (since the agreement with the Local Authority) to 14 candles. The circumstances fit in with the provisions found in the Harlow and Sawbridgeworth Gas Bill. Several Electricity Bills have been under discussion during the week—one of them (the North Wales Electric Power Bill) being of exceptional interest from the fact that the proposal is to use the waters of Llyn Llydaw on the eastern slopes of Snowdon for generating electricity. It has passed successfully through Committee. The Derbyshire and Nottinghamshire Electric Power Bill has also been before the Unopposed Bills Committee of the Lords; and among the powers contained in it is one allowing the promoters to take steps to acquire the electrical undertakings of certain local authorities.

Company v. Corporation.

The Newcastle and Gateshead Water Company have come to Parliament with a very strong case for their Bill, in which they ask to have conferred upon them additional powers; and upon the case the Tynemouth Corporation were unable to make any injurious impression when it was laid before Lord Clifford of Chudleigh's Committee on Monday and Tuesday last week. Eminent Counsel and several equally eminent Water Engineers were engaged in the defence and attack. The financial part of the Bill (wherein the Company seek to be allowed to raise £150,000 as 7 per cent. ordinary or 5 per cent. preference stock, with one-third loan) was not called in question; but hostility fell entirely upon the project for the extension of the limits of supply, so as to include a number of poorly supplied parishes in Northumberland. The Company came with the support of the Northumberland County Council and with requests from other Authorities for supplies. But the Tynemouth Corporation objected, and in the same boat were

the Cramlington District Council and the Tynemouth Rural District Council. The two latter, however, were sent away with a promise that the promoters would exclude their areas from the extended district if they could have the right to carry their mains through the two Authorities' areas. To the acceptance of this arrangement, no difficulty presented itself. This left only the Tynemouth Corporation to be dealt with. It seemed, however, that the Corporation had little of which they could complain, seeing that hitherto they have been unwilling to take upon themselves the responsibilities that the Company are prepated to undertake. Now the Corporation, urged by the action of rhe Company, told their Lordships that they were anxious and willing to supply water, on the lowest terms, to the Local Authorities in the district; but they had no objection to meet the Company in fair competition. These "death-bed repentances" do not now appeal to Parliament. We have seen more than one illustration of this in the present session. The Company proved their capability to supply the district. The Catcleugh reservoir has been completed by the Company; and they will be able to supply water from it in the course of the present summer. In fact, Mr. Charles Hawksley and Mr. E. M. Eaton respectively asserted that they have now enough water to meet the needs of the existing and extended district for 28 or 30 years. The consumption of water in the Company's area is at present about 15¼ million gallons per day, and, when the Catcleugh reservoir is ready to supply, they will be in possession of another 10 millions. Under these circumstances, it is not surprising that the Committee decided to give the Company the powers they asked for, and not to grant the petition of the Tynemouth Corporation.

LEGAL INTELLIGENCE.

HOUSE OF LORDS.—Thursday, May 5.

(*Before Lord* MACNAGHTEN, *Lord* JAMES OF HEREFORD, *Lord* DAVEY, *and Lord* ROBERTSON.)

Cannon Brewery Company, Limited, v. The Gaslight and Coke Company.

This was an appeal against a decision given by Lords Justices Vaughan Williams, Stirling, and Mathew, in the Court of Appeal, to the effect that an incoming tenant of licensed premises is, in certain cases, liable for the unpaid gas account of the outgoing tenant.*

Mr. C. A. RUSSELL, K.C., and Mr. SPOKES appeared for the appellants; Mr. DANCKWERTS, K.C., and Mr. ROLAND VAUGHAN WILLIAMS represented the respondents.

Mr. RUSSELL, in opening the case, said the appellants became the successors in occupation of No. 388, Harrow Road, of a Mr. Lowles, who at the time of the change was indebted to the Gas Company in the sum of £10 1s. 3d. This amount he did not pay. The appellants did not require any supply of gas at all to the premises; and though this was so, the Company demanded of them the unpaid amount, and contended that they were entitled to it by virtue of section 18 of their Act of 1872. This section ran as follows :—

> In case any consumer leave the premises where gas was supplied to him without paying to the Company the rate or meter-rent due from him, the Company shall not require from the next tenant of the premises payment of the arrears so left unpaid, unless the incoming tenant agreed with the defaulting consumer to pay the arrears, or unless the incoming tenant shall continue the trade or business of the outgoing tenant, and shall have paid to the owner, lessee, or mortgagee in possession, or to the outgoing tenant of such premises, a consideration for so doing; but the Company shall, notwithstanding any such arrears, in the absence of collusion between the outgoing and incoming tenant, supply gas to the incoming tenant as required by this Act on being required by him to do so.

The case was heard in the Clerkenwell County Court, and Judge Edge decided in favour of the Brewery Company; but his Honour gave leave to appeal to the Divisional Court, where the Lord Chief Justice and Justices Darling and Channell upheld the view of the Court below. The case was then taken to the Court of Appeal, where the decision was reversed. A similar case—that of *The Gaslight and Coke Company v. Mead*—was decided in 1876 in the Queen's Bench Division, the decision being in favour of the respondent; so that it was a question really which of the two was to stand. In Mead's case, the Court decided that the section of the Act in question did not impose upon the incoming tenant the personal liability to pay the debt; but the Company could make it a condition that it should be paid before they supplied the incoming tenant with gas, or they could threaten to cut off the gas. In the present case, it was a matter of complete indifference to the appellants whether the gas was cut off or not, because they did not require a supply. In earlier Acts, there were also sections which were germane to the subject; but he submitted that neither the Act of 1872 nor the Act of 1870 compelled an incoming tenant, without an agreement, to pay the outgoing tenant's unpaid gas account. It was not suggested that there was any agreement here; but the ground on which the respondents based their case was that the incoming tenant was continuing the trade of the outgoing one. Counsel proceeded to quote sections of Acts bearing on the question of the obligation of a gas company to supply gas where it was required.

Lord DAVEY: Do you say they are not bound to supply?

Mr. RUSSELL replied that they were not; they might refuse. Section 14 of the Metropolis Gas Act of 1860 gave the Companies protection in this—that they were not to be bound to connect any premises with the mains unless the owner or occupier was willing to contract for not less than two years, and pay gas-rates in respect of the supply to an amount equal to 20 per cent. on the outlay.

Lord JAMES: Is it admitted that the incoming tenants came within one of the two exceptions mentioned in section 18?

Mr. RUSSELL: One of the exceptions was that the tenant continued the trade of the outgoing tenant; and the Court of Appeal decided that the Gas Company had the right to sue the incoming tenant for the arrears.

Lord JAMES: What did they hold as to "cutting off"?

Mr. RUSSELL: They held incidentally that there was no right to cut off. That was not quite correct, because no supply was demanded; but they would have had the right to refuse to supply gas had it been asked for. If we said we wanted a supply of gas, they could have said: "No; we shall not give it unless you pay up the arrears of the last tenant."

Lord MACNAGHTEN: If they required you to pay arrears, and you said you did not want any more gas, according to your view this would be an end of it?

Mr. RUSSELL: Yes, my Lord. If it was intended that the incoming tenant was to be liable to pay the arrears of the outgoing one, it would have been perfectly simple to put it in the Act in plain language.

Lord ROBERTSON: You admit that the section gives the Gas Company the right to "require"?

Mr. RUSSELL: I say it is for the Company to make out that legislation has given them any right at all.

Lord ROBERTSON: What I suggest is that this section 18 is a limitation upon someone or other.

Mr. RUSSELL: There is no place, other than section 18 itself and section 15 of an earlier Act, in which any reference is made to this matter, subject to this—that there is a section in the General Act of 1860 which is identical in terms with section 15 of the Company's Special Act of 1870. Section 39 of the earlier Act is in the same terms as section 15 of the Act of 1870. What I say is the highest position the Company can occupy is this: Assuming that the incoming tenant has not got by statute a right to require a supply of gas, then the Company might say: "Inasmuch as you cannot by statute compel us to give you gas, we will not, by contract, give you a supply unless you pay the arrears."

Lord JAMES: Then what do you take to be the meaning of the words in the section?

Mr. RUSSELL: What I say is that if the incoming tenant has the right to require a supply of gas, then there is nothing in the Acts of Parliament—either in the Company's Act or the General Act—to entitle the Company to say: "We will not give you that supply unless you pay the arrears." But if there is no statutory right for the incoming tenant to require a supply, then, of course, I admit that the Company could refuse it.

Lord JAMES: You shut out the concluding words of section 18 of the Act of 1872.

Mr. RUSSELL: What I say is that if there is a statutory right in the incoming tenant to demand a supply of gas, the section does not confer upon the Company any right to say: "Before you shall have the gas, we shall require payment of the arrears from you." Even if the Act of 1860 contained that right, it could not avail the Company, owing to the specific terms of section 18 already referred to.

Lord JAMES: Supposing the concluding words of section 18 were struck out, then by the earlier part the Company would have the right to sue for the arrears.

Mr. RUSSELL: If I were the incoming tenant, and did not agree with the outgoing tenant, or continue his business, I could rely upon this section.

Lord JAMES: What is the meaning of "require," if it is not "to obtain"?

Mr. RUSSELL: If I wanted a supply of gas, the Company might possibly obtain the arrears by saying: "You shall not have a supply unless you pay." What is provided is that they shall "not require" unless the tenant goes to them for gas.

Lord ROBERTSON: You did not want the gas; and therefore there was no occasion to require payment.

Mr. RUSSELL said it was for the Gas Company to show that they had the right to require payment. It could not be said that section 18 was clear and plain; but the decision in the Mead case had stood for nearly 30 years, and he submitted that it ought not lightly to be overruled. In that case, Mead had become the successor in business, and continued the trade, of an out-going tenant named Murray, who had left the premises owing a sum of money for the gas supplied to him. Proceedings by summons in the Police Court were taken by the Gas Company to recover from Mead the arrears due from Murray; but the Magistrate refused to make an order against him. There was an appeal, however, and the Court held that section 39 of the Act of 1860 did not say that the incoming tenant should be personally liable for the arrears of his predecessor.

Lord JAMES: Is section 39 the same as section 18 of the Act of 1872?

Mr. RUSSELL: It does not contain the words about continuing the business; but it is the same with that exception. The claim in the Mead case was made under section 18 of the Act of 1872—the section that applies to the present case. And when Mr. Willis, arguing for the Company, was asked to point out where it was that they were required by the Act to give a supply of gas to the incoming tenant, he seems to have referred to section 39 of the Act of 1860.

Lord JAMES: Did Justice Blackburn say what construction he put on section 18?

Mr. RUSSELL: His construction was that it did not make the incoming tenant liable.

Lord DAVEY: The Company might require payment, and then cut off the gas.

Lord JAMES: You did not want the gas; and therefore it ceased to be supplied—not cut off, which sounds hostile. It is not an apt term to say "cut off" when the tenant did not want the gas.

Lord DAVEY: You do not care as to the term, Mr. Russell; what you object to is the liability of the incoming tenant.

Mr. RUSSELL: That is so. I say they have no right to bring an action against me. I do not want their gas. It is quite clear that if the incoming tenant is not in a position to require a supply of gas, then the whole of the section does not apply to him.

* See "JOURNAL," Vol. LXXXI., p. 642.

Friday, May 6.

On the resumption of the hearing this morning,

Mr. RUSSELL, continuing his argument, submitted that whatever was the meaning of the words in section 39 of the Metropolis Gas Act, 1860, was the meaning of the same words repeated in the Gas Company's Acts of 1870 and 1872. These were, in effect, that in case any consumer should leave the premises without paying his account, the Company were not to require from the next tenant payment of the arrears unless certain things happened.

Lord JAMES: Does the wording proceed to the end the same in all the Acts?

Mr. RUSSELL replied that it did, except in the 1872 Act, when the Company first introduced the question of the incoming tenant continuing the trade or business. The words upon which they relied were the negative ones "shall not require from the next tenant." They sought to extract out of these words a positive right conferred upon them not merely to require, but, as they said, to recover by action.

Lord JAMES: What meaning do you give to the word "require"?

Mr. RUSSELL: I say it cannot mean anything more than "stipulate for."

Lord JAMES: You could have done that without the statute.

Mr. RUSSELL: This does not say "may require," but "shall not require unless," &c.

Lord JAMES: Of course, we know it is a negative; but do you give any effect to those words?

Mr. RUSSELL replied that he did; and he said that if he might bring that matter in when he came to it, it would be more convenient. He then proceeded to deal further with the Mead case.

Lord DAVEY pointed out, with regard to section 39 of the Act of 1860, that it might not give the Company a personal remedy, though it might give them security. It might mean that the incoming tenant was not personally liable, but that the property he took from the outgoing tenant still remained liable.

Lord JAMES remarked that if the learned Counsel's contention was right, section 39 of the Act of 1860 was most unfortunately drawn.

Mr. RUSSELL submitted that the words "require payment" in the negative were extremely inadequate to give the Company the right to sue. He was not there to defend the section by any means.

Lord DAVEY: You think it could have been made clearer by better language?

Mr. RUSSELL: It might have been made clear one way or the other.

Lord DAVEY: The terms of the Act were made on the assumption that the incoming tenant would require the gas.

Mr. RUSSELL: As a rule, the incoming tenant would require gas.

Lord DAVEY: And he could not get it from anybody else.

Mr. RUSSELL: London was parcelled out in districts, and each Company had a monopoly in a certain district. I say it would be unjust to expect a tenant to pay for the arrears, unless he had come to an agreement with the outgoing tenant.

Mr. STOKES said it was a most extraordinary condition to put into an Act of Parliament, that a Company should be allowed to sue one person for another person's gas account; but if this was meant to be so, then the words of the section should be in plain, clear, and apt language. It was absurd to put it in negative language. The draftsman should have used the words "shall be liable."

Lord JAMES: You may be correct in attributing all this to the draftsman; but we have to look at it as an Act of the Legislature.

Mr. STOKES: Yes, my Lord; and I will treat it in that way. Would any Committee or layman use the words "shall not require unless"? They are insidious words. Counsel concluded his remarks by contending that the decision of the Court of Appeal was an unfortunate one and was wrong.

Mr. DANCKWERTS submitted that the Court of Appeal were right. They could not have more apt words than those in the section. To put his argument shortly, it was this: The Gas Company were under a liability to supply gas to an incoming tenant if the tenant wanted it. If they did not supply it, they were liable to a penalty; and they had no power to cut it off except where a consumer was in default. Then, said the Act of Parliament, we will give the Company, under those circumstances, a right against the person to whom they must supply gas, with regard to the outgoing tenant's arrears. He therefore submitted that the words of the section were not at all inapt.

Mr. STOKES having replied,

Their LORDSHIPS reserved judgment.

HIGH COURT OF JUSTICE—KING'S BENCH DIVISION.

Wednesday, May 4.

(*Before the* LORD CHIEF JUSTICE *and Justices* WILLS *and* KENNEDY.)

The King v. Mayor and Corporation of Tenby.

Mr. MACMORRAN, K.C. (with him Mr. R. C. GLEN and Mr. E. COUMBE), said he appeared on behalf of the Corporation of Tenby to show cause against a rule granted by the High Court for a writ of *certiorari* to remove into the Court a certain order or resolution made or passed by the Corporation on July 23, 1903—being an order for payment of the sum of £600, subject to section 141 of the Municipal Corporations Act, 1882—on the ground that the orders for payment created an illegal overdraft. The order was made on the Treasurer of the borough at the instance of Mr. Allen. It appeared that for some years past attempts had been made in Tenby to procure a water supply; but they had proved abortive, and certain expenses had been incurred. At the end of the financial year, 1903, some of the amounts which had been paid to the Engineers and others stood in the books of the Treasurer as an overdrawn account. With the view of obtaining the sanction of the Local Government Board to the expenditure, the Corporation asked the then Treasurer to allow the £600 to be carried to a suspense account, in order that it might be made the subject of an application for a loan at some future date. The Treasurer refused to do this; and thereupon the Corporation made an arrangement with Lloyd's Bank to pay off the old Treasurer, and do what they required. The £600, the subject of the present proceedings, was the order drawn on the new Treasurer to pay off the old one. In these circumstances, an application was made for a *certiorari* to quash the order. It was made really under section 246 of the Public Health Act, 1875, which provided that the accounts of an urban district, where it was a borough, were to be examined by Auditors elected under the Municipal Corporations Act. The expenses of providing a water supply had to come out of the general district rate, and not out of the borough funds. Assuming section 141 applied to the case, he should submit that it was entirely a matter for the discretion of the Court to say whether, under the circumstances, the order should be quashed; and this was not done unless there had been a misapplication of money. In the event of the loan not being sanctioned, it would be illegal to pay the money, and then would be the proper time for anyone to raise an objection.

The LORD CHIEF JUSTICE asked what was the legal ground on which the other side based their case.

Mr. MACMORRAN said, as he understood, it was this—that the overdraft really amounted to borrowing from a banker; and borrowing without the sanction of the Local Government Board was unlawful. Application had been made to the Board for permission to borrow £16,000 to establish water-works, and, after inquiry, the scheme, known as the Ritec scheme, was not approved; but the Board intimated that they would be prepared to entertain an application for sanction to raise a loan for obtaining a supply of water from another source. In connection with this new scheme, liability had been incurred to engineers and others; and the money would have to be borrowed. After calling attention to various sections of the Act, Counsel submitted that this was not a payment which the Court should quash, and that the application was premature.

Justice WILLS suggested that the case should stand over until after an application had been made to the Local Government Board.

Mr. MACMORRAN thought this would be a reasonable course to adopt.

The LORD CHIEF JUSTICE said if the money had been spent in trying to obtain a water supply for the town, it seemed somewhat ridiculous to suggest that the amount should not be allowed.

Justice KENNEDY: Suppose the Local Government Board sanction the scheme, the loan would only be a proper charge as from the date of the sanction.

Mr. MACMORRAN: No; the loan is granted for specific items—so much for construction of works, and so much for preliminary work. Unless the amount could be carried forward to a suspense account, there would be great difficulty in the matter.

The LORD CHIEF JUSTICE said the better plan would be to adjourn the case until after the Local Government Board had given their decision upon the application for a loan.

Mr. DANCKWERTS, K.C. (with him Mr. C. C. HUTCHINSON and Mr. E. PALMER), objected to any adjournment, as the matter had already been before the Local Government Board, and the whole of the £600 had been paid out of the rates.

The LORD CHIEF JUSTICE asked what would be the result of quashing the order.

Mr. DANCKWERTS said the result would be that the Corporation would owe the bankers so much money. The amount advanced by them had gone to pay what might be described as state claims. Quashing the order would not undo what had been done; the only result would be that Lloyd's would have to wait for their money until the Local Government Board sanctioned the loan.

The LORD CHIEF JUSTICE was of opinion that the rule must be made absolute. He should have been very glad if, by arrangement or otherwise, the hearing could have been postponed until the Local Government Board had had an opportunity of considering the matter. He had no doubt Mr. Allen had acted from the best motive possible; but his proceeding might have the effect of putting great difficulty in the way of persons who had only been carrying out a public duty. As he did not think the Board would have their judgment in any way fettered by the existence or non-existence of these particular orders, it would be better to deal with the case strictly. It appeared that for something like three or four years expenses had been incurred in connection with a scheme for the supply of water; and there was nothing to show that they were not incurred *bonâ fide* by the Corporation for the benefit of the ratepayers. An overdraft had been obtained from the National Provincial Bank upon the representation that the amount would be included in the estimate for 1903-4. The Corporation then made a request for the continuance of the overdraft, which was refused on the ground that the Treasurer did not think he was justified in acceding to it. The Corporation then endeavoured to get over the difficulty by asking Lloyds to pay off the National Provincial Bank. This was, in effect, borrowing money. The order whereby the Corporation authorized it, and the cheques paid in pursuance of the borrowing, were all part of the same operation; and the result was that the Local Authority, instead of including the amount within their estimate for the year, had by this machinery arranged that they would be able to borrow money for the time being from other sources. Assuming the Court was not doing an injustice, this arrangement ought not to be allowed to stand. The Local Authority must get out of the difficulty in the best way they could, without relying upon the orders in question. If the money had been *bonâ fide* expended in experiments to obtain a water supply, the Local Government Board would, no doubt, include it in any loan which they might sanction.

Justices WILLS and KENNEDY concurred.

The order was accordingly made absolute, with costs.

The Marylebone Electric Lighting Question.

Last Friday, application was made by Mr. Fletcher Moulton to Mr. Justice Buckley, on behalf of the Marylebone Borough Council, for a further extension of time, until the 30th prox., for discharging their obligations under the judgment against them for the specific performance of their agreement to take over the electric lighting of the borough.

Counsel stated that the Bill now before Parliament would shortly be passed, and that the London County Council had agreed to the proposed loan. The defendants offered to pay on account £5000 down, and £5000 on or before the above-named date. Mr. Cripps, K.C., for the Electric Supply Company, agreed to the proposed extension of time, and said that the plaintiffs were desirous to proceed amicably; but they called the attention of the Court to the fact that since the last application for an extension they had spent large sums upon the works, which would be for the benefit of the Corporation. They further pointed out that the balance of the capital expenditure owing now amounted to £28,752; and they stated that it was anticipated a further sum of £10,000 would be expended by June. His Lordship extended the time; the Council paying the two sums they had offered.

Damages for Injuries Caused by a Gas Explosion.

At the Wolverhampton County Court, last Friday, his Honour Judge Howland Roberts and a Jury heard an action brought by Mr. T. J. Allen, a fender manufacturer, of Dudley, against the Wolverhampton and Dudley Brewery Company, Limited, to recover £50 compensation for personal injuries sustained by an explosion of gas in one of their licensed houses, as the result of negligence of the defendants or their servants. The case for the plaintiff was that on Feb. 10 he and a friend went to the Castle Hotel, Dudley, belonging to the defendants, and called for refreshments. A short time afterwards, they perceived a strong smell of gas, and went into the bar parlour. The attention of the Manageress was called to the smell; and a little later the gas-brackets were tested with matches. The result was that an explosion of gas occurred. Plaintiff and his friend were at the time going along a passage. They were thrown down, and plaintiff was so seriously hurt that he had to be removed to the hospital. He was incapacitated from following his employment for five weeks. For the defence, it was contended that the plaintiff only suffered from a slight shock. The Jury, after a few minutes' consideration, returned a verdict for the plaintiff for £15 and costs.

A Consumer's Objection to a Prepayment Meter.

His Honour Judge Lindley, sitting at the Chesterfield County Court, last week heard a somewhat extraordinary action, in which the Rev. John Waterfield, curate at Eckington, claimed from the Eckington and Mosbro' Gas Company £10 damages for trespass, by reason of the defendants, by their servants, breaking and entering premises known as Lady Sitwell's School, in Southgate, Eckington, in the occupation of the plaintiff, removing therefrom a gas-meter, and substituting therefor an "objectionable contrivance" known as a penny-in-the-slot machine. The bill of damages was made up of the following items: To cost of fixing meter, 18s. 3d.; to extra cost of gas owing to supply being given by the contrivance referred to, 11s. 9d.; to cost to be incurred in the removal of the said contrivance and the installation of a proper legal meter, £1 10s.; and "general damages," £7. In the alternative, the plaintiff claimed the above-named sum as damages for breach of a contract whereby the defendants agreed to supply the premises with gas through the meter removed by them. The plaintiff said he told the Gas Manager (Mr. William Hughes) that he would be responsible for the accounts of the Bible class held in the building; and the meter was put in on that undertaking. Between the date when it was put in and the time of its removal, he never had any complaint. After the removal of the meter and the substitution of the penny-in-the-slot machine, he went to see Mr. Hughes, and asked him to restore the other meter; and he promised to do so next day, but did not. Witness ultimately went to see Mr. Barber, the Chairman of the Company, to get an explanation, but the only explanation he obtained was that the Company usually acted in this manner with people who ran away, as they must have some security. There was no ground for the supposition that he was going to run away. He had used the prepayment meter because he had been compelled to do so; but they had no light the first night, because they did not understand it. For the defence, it was contended that the Manager thought the Bible class boys would pay for the gas. The plaintiff said he would be the guarantor; but the Company believed the boys were primarily liable under the contract. One reason why the meter was changed was that the plaintiff was said to be leaving the place, and another was that the Treasurer of the class asked them to do so. His Honour thought the defendants had done wrong, and should restore the former "legal" meter. He did not, however, see that plaintiff had suffered anything beyond mere nominal damages—say, 2s. 6d. The defendants acted perfectly *bonâ fide* in the matter; and it seemed a most trumpery case. He found for the plaintiff for 2s. 6d. damages, with costs, and ordered the old meter to be restored.

Blackburn Water Supply.—From a statement presented to the Finance Committee of the Blackburn Corporation, showing the income and expenditure of the Water Department for the year ending March 31, it appears that the loss on the working was £397, compared with a loss of £740 twelve months ago. It is expected that this loss, which has been a diminishing sum for a long time, will have disappeared entirely when next year's balance-sheet is issued. The total expenditure during the past twelve months was £42,146.

Water Supply of Croydon.—At a recent meeting of the Croydon Town Council, the Finance Committee reported that some letters had been received from the Local Government Board, enclosing sanctions to borrow the following sums: £5000 to defray estimated expenditure on works of water supply (extension of mains) during the next three years; £225,810 for the purchase of so much of the Lambeth Water Company's undertaking as is situate within the borough, to be repaid within a period not exceeding 60 years from the date of borrowing; and £1000 for costs in connection with the proceedings before the Court of Arbitration, and the transfer of the undertaking, to be repaid within a period not exceeding 60 years from the date of borrowing.

MISCELLANEOUS NEWS.

ROYAL COMMISSION ON LONDON TRAFFIC.

The President of the Institution of Gas Engineers Speaks for the Gas Companies.

At the request of the Gas Companies' Protection Association and the Directors of the Commercial and Wandsworth and Putney Gas Companies, Mr. H. E. Jones, M.Inst.C.E., the President of the Institution of Gas Engineers, and Chairman of the above-named Association, presented himself for examination at the sitting of the Royal Commission on London Traffic last Thursday afternoon; and, as will be seen, he gave some interesting and valuable evidence. Sir David Barbour was in the chair.

The Gas Companies' Operations not the Cause of Inconvenience to London Traffic.

The first part of Mr. Jones's evidence was directed to exonerating the Gas Companies from blame for the disturbances in late years of the traffic of London due to the repeated opening of the streets. In the first place, he said that there did not exist, and had not existed for many years, any misunderstandings or disagreements between the authorities in the districts where the Companies known to him were operating which would call for any special legislation. There was no serious inconvenience caused to traffic by the operations of these Companies, because 95 per cent. of the openings were merely for attaching or repairing service-pipes between the consumers' houses and the mains; the occasions for relaying mains being very rare, and of limited extent. In no case of the former class would the roadway be disturbed for more than half its width in length of trench, nor more than a foot in the width; and the operations would not last for more than two or three hours at the outside. The work of relaying the average main of the average gas company, which would be about 7 inches or 8 inches in diameter at the most (this was the average size, as there were pipes in the streets running from 3 to 4 inches up to 48 inches), would not involve the opening of a road for a longer period than one day in any particular part for a length of 50 yards; this length being dealt with in that time successively with other lengths on previous and succeeding days. The largest main known to him could be dealt with in one day—the ground filled in again, and the pavement made sufficiently good for ordinary traffic. The proper relaying of the pavement would, of course, mean a second operation, which would be carried out by the local authorities. But, generally speaking, the operations were simple, rapidly done, and, over the length executed on any particular day, the ground and the pavement were filled in and restored before evening.

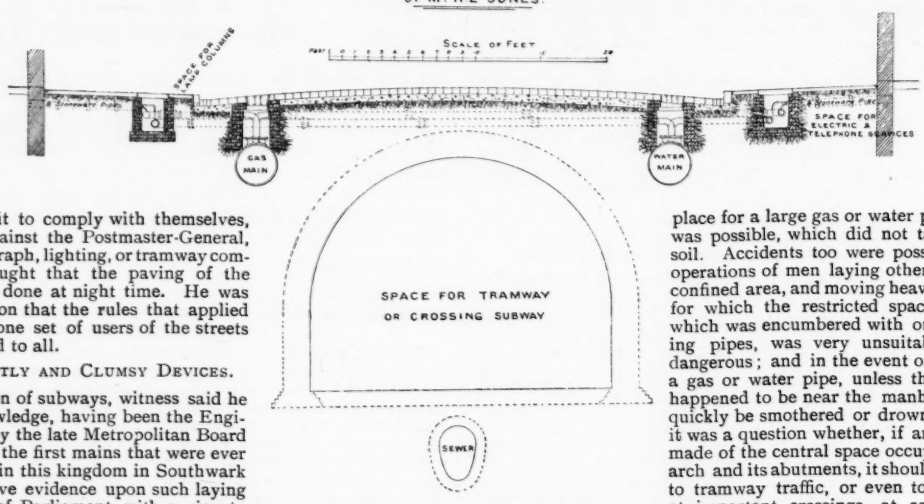
The Telephone Owners and Electric Light Companies the Aggressors.

Of late years in the County of London there had, said Mr. Jones, been an exceptionally large number of openings in connection with the Post Office system of telephones, which had caused some of the most important streets to be opened repeatedly; and in his observation the contractors, presuming upon their working for a Public Department, ignored the convenience of the wayfaring public altogether, and in a manner which he (witness) would never have permitted in the case of a contractor for a gas company's works. [Witness gave examples, and said the general impression left on his mind was that the roads in these instances were open for several weeks.] An equally large and aggressive extent of openings had occurred in connection with the mains of electric lighting companies, who had established works outside London, had cut up the roads from east to west in a terrible manner, and had invaded very much the rights of the previous occupiers of the subsoil. A special case that he had in view in this connection was in the Whitechapel Road. An electric light company built new works at Stratford for the supply of the City of London; and in the roadway they made a large opening—greater than the Gaslight and Coke Company would have made for the big main running from Beckton to London. Naturally, this opening caused great inconvenience to the public and to the traffic. The electric light companies also had their cables very much too close to the gas and water pipes. When a road was found crowded with pipes, the only way for these people to avoid them would be to spend a little more money and go a little deeper. He was not aware that there was any power to control these companies in such cases. Further, very extensive openings had been made by the substitution of electric power for horse traction in the public tramways. All of these works had been carried out either by people not having previous experience and necessary skill, or at any rate having little or no regard for the public convenience; they appearing to consider themselves acting for public bodies, and therefore licensed to ignore the wayfarer's convenience. In the case of large works of pipe-laying for gas and water purposes, the Companies employed experienced contractors, with skilful men, to do the work; and they got through it rapidly. He had often noticed that the paving of the most important thoroughfares, like London Bridge, carried out by contractors for the Corporation, and works carried out for the Borough Councils, appeared to be dealt with in a most dilatory manner, no regard being had to the importance of keeping a main artery—as, for instance, one near to a large railway terminus—in going condition.

Laying Mains at Night Time.

Proceeding, witness said he had knowledge that before the Corporation admitted the Great Central Consumers' Gas Company to lay mains throughout the City, somewhere about the years 1850 to 1855, they insisted that the pipes should be laid during the hours of night time, and that the whole of the surface of the road should be restored before important traffic commenced on the following morning; and, in point of fact, the whole of these mains were so laid. But that which the Corporation enforced at the hands of a private company, they

DIAGRAM REFERRED TO IN EVIDENCE OF Mr H E JONES.



never thought fit to comply with themselves, or to enforce against the Postmaster-General, the electric, telegraph, lighting, or tramway companies. He thought that the paving of the streets might be done at night time. He was strongly of opinion that the rules that applied to the work of one set of users of the streets should be applied to all.

Subways—Costly and Clumsy Devices.

On the question of subways, witness said he had special knowledge, having been the Engineer employed by the late Metropolitan Board of Works to lay the first mains that were ever put in a subway in this kingdom in Southwark Street, and to give evidence upon such laying to a Committee of Parliament, with a view to compelling Gas and Water Companies to divert their mains into the subways. He showed the practical possibility of it; and the Board were anxious to have the subways. But while he was going through the case, and watching it in Parliament, he came to the conclusion that it was a very costly and clumsy device for doing away with the opening of the roads for such purposes as the Gas and Water Companies required. The cost, according to estimates discussed at the time, was some £12 per foot run; and the galleries leading from them to the houses were also very expensive. He thought these would add at least £3 to the cost. The £12 was the estimate for making the subway, without the cost of the pipes; so that the cost would come to a considerable sum per mile. Of course, in new streets the cost would not be so great, as there would be no pipes to uphold. The average gas-main would cost about 2s. to 3s. per foot. The expense for a subway was to obviate the necessity of opening the roads upon the arterial mains; but, in point of fact, the arterial mains in a very important thoroughfare never did require opening up, because they never wore out, and would naturally, in an important thoroughfare, be of such large scale that they would never need to be supplemented.

An Alternative Suggestion, and a Contribution from the Local Authorities.

At much less cost to the public authorities than the subways, there might, witness said, be put in each road so large a gas and water pipe—say, 3 feet—that all the necessary operations in connection with it, such as clearing it from any deposit, liquid or solid, could be done from the inside of the pipe itself, which could be isolated by suitable valves at distances of (say) 100 yards, with a manhole at each valve communicating with the surface by a chamber covered with a proper door or plug. Such mains could be connected with smaller service-mains, of which each company would have one in either footpath. If the footpaths were so arranged that in a width of 12 feet the flagstones met in continuous lines along the centre, and rested upon a brick wall at either end, these pipes would be readily accessible; the space around them being filled up with loose earth easily excavated. From the houseward 6 feet of the pavement at the party wall of each pair of houses, there might be an 8-inch drain-pipe through which the four services for the two houses—one each of water and gas for each house—might conveniently be passed; being connected at their outer ends with the gas and water pipes respectively. There the 8-inch pipes would be the ordinary glazed earthenware pipes, such as were employed for drains. To prevent any possible escape into the house of gas or water from any leakage, these drain-pipes might, after the pipes had been laid in them, or afterwards repaired, be plugged up with a few inches of earth at each end, and finished at the mouth of the earthenware pipe with a facing of cement mortar, 2 inches thick. (Witness handed in copies of the accompanying plan.) With such provisions as these, there would practically be no difficulty in at any time getting at the gas or water service to the house from the service-main. The valves connecting these to the mains could be small, lying horizontally, and easily worked from the chamber. Taking the case that in such a street as is contemplated, the gas or the water company might find their utmost carrying necessity for gas or water would involve a 24-inch main, which would, roughly, cost them 35s. a yard run; and they should be induced, by a contribution from the authorities of another 20s. per yard, to lay of pipe of 36 inches diameter. It was possible that this contribution might be larger than the above estimate; but, in any case, it would be far below the surplus cost of a subway beyond what was covered by the rents allowed to be charged to the Companies.

Interposing, the Chairman said he thought the Local Authorities would say that the Gas and Water Companies should meet the extra cost of 20s. per yard. Their argument would be that, as it was the Companies who used the pipes for their own advantage, it was the Companies who should bear the whole of the cost; and that, if it were necessary to protect the street by laying a larger pipe, the Gas or the Water Company should pay the extra cost. Witness, however, maintained that in ordinary cases it would be only reasonable for the Local Authorities to bear the extra cost of the larger pipes. He thought it would be unreasonable (except, perhaps, in very important streets) to say the Companies should be asked to spend an extra £1 per yard. Under such a mutual arrangement, the cost to the Gas and Water Companies would not be more than under present circumstances.

In addition to the expense, witness held that a subway was not a good place for a large gas or water pipe. Oxidation was possible, which did not take place in the soil. Accidents too were possible through the operations of men laying other pipes in a very confined area, and moving heavy weights about, for which the restricted space of a subway, which was encumbered with one or two existing pipes, was very unsuitable, not to say dangerous; and in the event of an accident to a gas or water pipe, unless the men engaged happened to be near the manhole, they might quickly be smothered or drowned. Moreover, it was a question whether, if any use was to be made of the central space occupied by the large arch and its abutments, it should not be devoted to tramway traffic, or even to footway traffic at important crossings—at any rate, it was of no use to the Gas or Water Companies, had no advantage whatever for them, would facilitate no necessary operations (there being practically none), would inflict extra cost in laying the pipes in the first instance, and would submit them to the dangerous risks from the operations of other parties; while, with the methods practised by the London County Council of debarring the officers of the Gas Company or Water Companies from free access, they would constitute a great public danger, for, in the event of a leak happening and being brought to the knowledge of the Companies, they had to go through a tedious and roundabout process to get access. Questioned by the Chairman, witness agreed that there were a large number of pipes in subways now; and, so far as he knew, there had not been any of these accidents. Still the risk existed; and it was growing worse as the subways became more crowded. The subway might become an explosion chamber all the way along; and he illustrated what he meant by the Tottenham Court Road disaster. His chief opposition to subways was that it was not now worth any Gas or Water Company's while going into them.

Road Openings and Methods.

As to road openings generally, Mr. Jones said he was prepared to agree that the Companies should be limited as to the length they should open at any one time, and as to their being permitted to bar the traffic of any thoroughfare altogether by the undue spreading of their spoil. There was always a tendency on the part of contractors, workmen, and foremen, to study only their own convenience and facilities for carrying on their work, and not to make such arrangements as might sometimes be made for (say) a single stream of traffic, if not two, where there was ordinarily space for three. Upon the point as to the spreading of the spoil over the street, there was some discussion between the Chairman and witness. In the event of complaint being made, Mr. Jones thought the Borough Surveyor (provided the Council were not themselves the offenders), could decide whether the contractor, or whoever was doing the work, was unduly obstructing the street. The Chairman said it had been suggested that there should be some impartial person appointed for this purpose; but witness thought that, in most cases, the Borough Surveyor should be the final arbiter. He agreed that the appointment of a third party would work, in nine cases out of ten.

There was, witness proceeded to say, a good deal of misapprehension in the public mind as to the gas-pipes needing to be repaired and replaced. In point of fact, the endurance of these pipes was almost unlimited; and the only occasion of removing them was to provide a greater way for the gas by laying down a larger pipe in place of it. This necessity did not arise in the service mains that he suggested for the footpaths, but only in the arterial mains, and then so very rarely that the extra provision suggested in this scheme would practically put them out of range altogether. Some obligation, he thought, ought to be put upon the Companies for proving the necessity for occupying the subsoil of a road with more than one arterial main and two service-mains, having regard to the convenience of others having the right to lay mains in the roads of various sorts, and also to the public convenience. He had knowledge of thoroughfares which had been so occupied by a careless and badly arranged system, that one Water Company would have seven or eight pipes of all sorts and sizes in the same road. He put in a diagram showing the actual state—a terribly crowded one—of a road leading out of Wandsworth and Putney; and all the pipes shown were the property of one Company. A more extravagant way of wasting capital he could not conceive, or one that was more unfair to any other parties whose pipes must occupy the subsoil. The Chairman asked whether there was any limit to the number of the pipes; and Mr. Jones replied that there was not, and there was no one to say that this excessive pipe-laying in the road was bad. The instance to which he was here referring came before him when the Wandsworth and Putney Gas Company wanted to lay a 24-inch gas-main; and in consequence of this condition of things, they had to go into a bye-road. An affirmative answer was given by witness to an inquiry of the Chairman as to whether there should not be some authority exercising control over the number of pipes in a street, and the manner in which they were laid. The object of the Water Company responsible for the laying of the pipes to which he had been alluding was to get, at the moment, a cheap conveyance of water; but, in the long-run, it was a short-sighted policy.

Reverting to the question of subways, witness said he only contemplated putting them in new streets of the first importance in the Metropolis, as the problem of constructing them in old streets would be too ruinous to contemplate. In his suggestion, he made no provision for telephone or electric wires; but as he only proposed to occupy some 3 feet of the width of each pavement, leaving (say) 6 feet between the houses and the partition wall of the chamber, there was ample space.

Local or Central Control.

As to the necessity of taking the control of the breaking up of the streets out of the hands of the Local Authorities (who are charged with the repair of the paving generally, and specifically with the contracts for repaving for the Companies, which worked very easily and well) and transferring it to some Central Authority which should have general control, witness was of opinion that there was no justification or necessity for such a change. His opinion was that the communications to and from a Central Authority would be tedious, cumbersome, and cause obstruction. It would be impossible that any Central Authority could, without great cost, have such a number of local inspectors or surveyors as would be necessary to at once deal with the cases arising on the notices of the Companies which had to be given under statute, and which applied to cases where the Companies themselves came under penalties for failing to complete the works giving supply to consumers in seven days. He considered that the demand for these changes had simply arisen through the abuse by the contractors to the Post Office and to the electric and tramway companies of the patience of the wayfaring public, and the very large operations that had been going on in the last few years in the Metropolis.

Suggested Legislation.

Regarding the suggestion that provisions similar to those contained in Part II. of the City of London (Streets) Bill, 1902, with regard to the breaking up of streets should be enacted and made binding as against all gas, water, and other companies, witness said the provisions in clause 5 of the Bill were quite incompatible with the notices required to be given by the existing General Acts. In connection with clause 6, he observed that as the subsoil of the Metropolis was occupied by such a large number of works, and of great variety, no records of which had been kept in any known office, it was quite impossible to give accurate plans of the works which might be necessary. Of course, the best managed companies now had plans of their distribution systems. Fortunately, too, the pipes of both the Gas and Water Companies were very adaptable, and could be made to pass in and about the pipes of other undertakings. The difficulty as to notice also applied to clause 7; there being statutory obligations to comply with notice to connect within seven days. The Chairman thought that it would be possible to get over the difficulty by saying that the three months' notice did not refer to service connections. Mr. Jones, however, explained that this would get over part of the difficulty, but not the whole. In the case of the re-laying of a main for a gas-engine supply, or in the event of a main becoming too small in midwinter, it would never do to have to wait for the expiration of three months before putting in a larger pipe. He saw no virtue in the three months, and thought a fortnight would be ample. Generally, there was really no necessity, so far as the Gas Companies at any rate were concerned, for these elaborate and tedious preliminary proceedings. Upon clause 17 of the Bill, witness said that where the Corporation were about to relay, it had always been his practice to avail himself of it for anticipating, and more than anticipating, the probable requirements of the succeeding ten or twelve years. Mains far in excess of the immediate requirements of his Companies had been laid in place of the existing ones, and this without any charge to the Authorities, but always subject to the condition (which was sometimes sought to be broken by the paving authorities) that, as they were laying these pipes more for the public benefit than their own, they should not pay for the paving works which were already in contemplation. The Local Authorities at Stepney, Poplar, and Wandsworth and Putney would be able to confirm the liberal action and smoothness of working in this particular, as in others between the Gas Companies and themselves. The idea of the Corporation, of course, was to have the street-pipe work carried out as far as possible while the thoroughfare was up. But he ridiculed the idea of only posting up notices of the breaking up of a street in the street itself, and thought notices should be sent by post to all with property in the subsoil.

It was remarked by the Chairman that what had been suggested was that, although the Companies would not break up any street for nine months, in cases of emergency they should be allowed to do so, if failure to break up the street would cause inconvenience. The further suggestion was that if any dispute on the question of urgency arose, there should be some separate person to determine between the Companies and the Local Authorities. Mr. Jones said they wanted a convenient arbitrator. The Chairman (continuing) said, under these conditions, witness seemed to think this plan might work: A shorter term of notice to be given by the undertakers; the local authority to give direct notice when the road was to be opened up; the road not to be broken up for nine months unless for urgency or the public convenience; and, in the event of any dispute, the matter to be referred to an arbitrator. Mr. Jones said he thought this would be quite practicable. He, however, saw no necessity for penalties beyond the damages which could now be recovered for negligence in operation.

Electrolysis.

Upon the injury to the pipes of the Gas Companies from loose currents of electricity, Mr. Jones said it would be desirable that some general regulations should be laid down for the guidance of all the Authorities as to preserving proper distances between newly laid electrical conductors and mains and the existing pipes of other Companies, and that they should be compelled to use such complete insulation, and so arrange for return currents as to avoid the danger, not only to the pipes, but to the workmen of the Gas Companies who had to carry on operations in the subsoil of the streets. Considerable damage was being wrought by escaping currents; and when cables were being laid provision should be made to guard against that. If they had the convenient arbitrator to whom he had called attention, he could be brought to bear upon the way the work was going on. He should be allowed to see the electrical cables were not going too close to the gas-pipes. The Chairman thought there were rules on this point; and witness agreed, but said the difficulty arose where there was a network of pipes. The officers of the Local Authorities would be good Referees, if the Authorities were not the owners of the electrical works.

General Observations.

Before concluding his evidence, Mr. Jones gave his views on street traffic generally; among his points being the opinion that no lighting standard should be fixed in the centre of the road, as, by dividing the road into two halves, it displaced one stream of traffic, and would turn a five-route roadway into a four-route one, and less than that for quick traffic which had to pass standing and slow-moving vehicles.

Answering other members of the Committee, witness said, with regard to the trouble that had brought about this inquiry, the Gas Companies were small sinners, but they got a good deal of the odium. He admitted that night work would be more expensive than day work; but the extra cost ought not to be placed before the public convenience. As to the provision of subways, he said he should not disturb existing pipes. If a new street were being made, the matter would be different. But he did not wish to go into a subway at all, because he could show (as he had done) a simpler, cheaper, and altogether preferable plan.

Mr. G. F. L. Foulger on the Question.

The Commissioners, at their meeting on Friday, had evidence from Mr. G. F. L. Foulger, the Distributing Engineer of the Gaslight and Coke Company, which position, it is interesting to hear, he has occupied for 15 years, out of a service in the Company of 39 years. The responsibility of his office was shown by the facts that the districts served by the Company comprise about 62½ square miles. Within this area gas is supplied to 383,490 consumers and 48,721 public lamps. About 2078 miles of cast-iron mains are in use, irrespective of the wrought-iron service pipes.

The Offenders.

Dealing with the serious disturbances of the streets during the past ten or twelve years, Mr. Foulger said that without in any way desiring to cast blame upon any other companies having statutory rights to open the streets, as to the manner in which such rights had been exercised, he thought he might fairly call attention to the fact that the obstructions had been very largely caused by those companies and bodies who, within this period, had been engaged in laying down, through practically every road and street in London, their distributing plant for the first time—the work proceeding practically simultaneously, and not with the gradual growth as had been the case in regard to Gas and Water Companies, extending over a period of ninety years. He alluded to the various Electric Lighting Companies and the Borough Councils supplying current, as well as to the underground telephones recently laid down by the Post Office Authorities.

The Openings by the Gas Company in the District.

The Gaslight and Coke Company, witness went on to remark, had three classes of mains—high-pressure, trunk, and service mains. The two former were invariably laid in the roadways; while the latter, wherever practicable, were laid in the footways. The high-pressure and trunk mains were only opened up for remedying defects or making connections to the service-mains. The service-mains being laid in the footways, a minimum of inconvenience was caused, as it was only necessary to open the footway between the main and the premises to be supplied. The following statement represented the total ground openings for last year; and this, he said, was a normal figure. Number of street openings on mains and services: Western division, 10,023; eastern division, 8106—total service openings during 1903, 18,129. The openings made for escapes, &c., on mains and services numbered 3144; so that they had a grand total of 21,273. The average number of openings per day was 70·91 (300 working days per year), or equal to one opening in every 29·3 miles of main per day, or one opening in every 172 yards of main per year. The total length of mains was 2078 miles. Of this total of 21,273 openings during 1903, 9375 were in connection with the supply of the slot meters, all of which would be to premises situated in other than main thoroughfares. Ordinary service openings represented 8754, most of which were in the suburban districts for giving new and additional supplies in those localities. With the advance of fifteen years since 1889, the mileage of mains had not increased in the City of London, but was slightly less, as was shown by the following figures: December, 1889, 90 miles 1241⅛ yards; 1899, 90 miles 1153⅛ yards; 1903, 90 miles 760⅛ yards. Cast-iron mains, when well laid, were practically indestructible, and seldom required opening up. New mains were now almost exclusively laid in the suburbs, and placed, generally, before the roads were fully made up and dedicated for public use. Consequently no obstruction is caused in this respect.

Alterations and Extension of the System.

It was pointed out by Mr. Foulger that, in the leading London thoroughfares, main work was principally confined to alterations such as were necessitated by diversions for tube railway stations and underground conveniences, and was usually carried out within the same hoarding surrounding the works necessitating the alterations. Consequently no additional inconvenience was caused to that contributed by the work itself. Wherever the Company desired to simplify pipe connections, or to lay dead any superfluous mains, advantage was always taken of the opportunities offered to do so—thereby minimizing the inconvenience—by doing the work when roads were stopped for the purpose of repaving works. As a matter of fact, examination was always made at these times, so as to ascertain whether any work was necessary, or would be so within a reasonable period, and to carry out such work when the roads were closed in order to obviate reopening newly made roadways. In new roads, such as the one now in course of formation between Holborn and the Strand, mains were always laid in

subways provided for the purpose. The Company had laid mains in 35 subways of a total length of 19,387 yards, and had always willingly and studiously complied with the Subways Act of 1893, and all of its various provisions, as well as with the Board of Trade regulations governing subways. Exclusive of service-pipes or house supplies, the openings on mains, for all purposes during 1903, amounted to only one in 1161 yards of main for the whole year.

THE SUBWAYS IN THE COMPANY'S DISTRICT.

Witness produced maps of the mains, showing their positions; and also a long list of streets which the Company had agreed with the Corporation of London to recognize as leading thoroughfares, and within which work, when necessary, was to proceed day and night, or night only, as desired by the Corporation. He further produced a list of subways completed to date, showing the size of the various mains and their lengths in yards: Victoria Embankment, 2980 yards of 36-inch mains; Victoria Embankment, 2350 yards of 30-inch mains; Victoria Embankment, 2150 yards of 4-inch mains; Queen Victoria Street, 2030 yards of 24-inch mains; Queen Victoria Street, 400 yards of 4-inch mains; Queen Victoria Street, 500 yards of 12-inch mains; Charing Cross Road, 70 yards of 18-inch mains; Charing Cross Road, 640 yards of 10-inch mains; Shaftesbury Avenue, 730 yards of 10-inch mains; Shaftesbury Avenue, 115 yards of 18-inch mains; Northumberland Avenue, 310 yards of 24-inch mains; Northumberland Avenue, 310 yards of 12-inch mains; Commercial Road East, 720 yards of 48-inch mains; Garrick Street, 260 yards of 5-inch mains; Rosebery Avenue, 186 yards of 6-inch mains; Arthur Street East, 334 yards of 6-inch mains; Austin Friars, 40 yards of 6-inch mains; Billiter Street, 35 yards of 6-inch mains; Cecil Court, St. Martin's, 95 yards of 6-inch mains; Charterhouse Street, 360 yards of 8-inch mains; Connaught Road, Albert Docks, 27 yards of 12-inch mains; Chatham Avenue, Nile Street, 160 yards of 4-inch mains; Edmund Place, Aldersgate Street, 210 yards of 6-inch mains; Edmund Place, Aldersgate Street, 20 yards of 3-inch mains; Fenchurch Street and Lime Street Avenue, 208 yards of 4-inch mains; Falcon Avenue, 80 yards of 6-inch mains; Galleons Entrance, Albert Docks, 53 yards of 12-inch mains; Holborn Viaduct, 810 yards of 10-inch mains; Holborn Viaduct, 200 yards of 24-inch mains; London Wall Avenue, 40 yards of 6-inch mains; Sun Street, 368 yards of 48-inch mains; St. Brides Street, 425 yards of 5-inch mains; Shoe Lane, 425 yards of 8-inch mains; Snow Hill, 440 yards of 8-inch mains; Three Colts Lane, E., 34 yards of 6-inch mains; Victoria Dock, 27 yards of 12-inch mains; Winchester Avenue, Wood Street, 53 yards of 3-inch mains; Mansion House, 128 yards of 30-inch mains; Mansion House, 51 yards of 24-inch h.p. mains; Mansion House, upright, 24 yards of 24-inch off 30-inch mains; Mansion House, upright, 24 yards of 14-inch off 30-inch mains; Mansion House, upright, 10 yards of 8-inch off 30-inch mains; Fitchett's Court, 33 yards of 4-inch mains; Middlesex Street, 6-inch mains; Lloyd's Avenue, 310 yards of 6-inch mains; York Street, Strand, 131 yards of 6-inch mains; Strand, north side, 416 yards of 24-inch mains; Strand, north side, 65 yards of 18-inch mains—total, 19,387 yards.

CONCLUDING STATEMENTS.

Mr. Foulger, in conclusion, stated that the Company would have no objection to have that made compulsory which had hitherto been worked in a voluntary spirit in connection with the opening of the streets—that was, when a street was going to be broken up (say, for repaving) the Borough Council should give the Company notice, and they would do what work was required to be done at that time; and that then the Company would not be entitled to break up the road unless for some good reason, to be judged by an independent authority. The Company had been working in harmony with all the Local Authorities. Disputes should, he thought, be referred to a standing arbitrator.

Asked whether if a standing arbitrator were appointed to deal with all such cases, he thought it would be of advantage in the interests of expediency and also in the co-ordination of results, witness replied: Provided there was not too much work to do, he should say "yes."

The Nantwich Award.—Several correspondents of the Nantwich papers have found the award in the gas-works arbitration a suitable subject on which to air their views. One of them signs himself "The Man in the Street;" and he writes to show, in the first place, the "utter absurdity of the award." He says: "According to the accounts furnished by the Gas Company themselves, the whole of the capital of the Company, including debenture stocks, preference, and ordinary shares, did not exceed £24,000. Now, in this £24,000 there are included 600 shares of £10 each allotted from the earnings of a number of years, over and above the dividends paid by the Company. Of course, no one will dispute that the shareholders were fully entitled to this money as earnings; but the money should have been paid over to the shareholders in dividends, and not allotted as shares, or it should have been set aside as a reserve fund. I suppose also it will be conceded that the debenture stocks and preference shares are not entitled to premium. Now if we deduct these 600 shares, the £5000 preference shares, and £7000 debentures from the amount of the award (£68,000), it leaves a sum of £50,000 to be paid for the original £6000 of ordinary shares—*i.e.*, for every £100 of stock, a sum of over £800 is paid! In other words, the happy possessor of £1000 of original stock is paid back his own, and is, in addition, presented with a small fortune of £7000 odd." He concludes his letter with a peculiar suggestion. "It is," he remarks, "an open secret that the Gas Company would have been amply satisfied with a much less award. Moreover, its Chairman and Directors are as good citizens as the members of our Urban Council themselves. That being so, I feel sure if the Council approached them in a proper spirit and went fully into these matters with them, showing the impracticability of the town's acceptance of the award, the Gas Company would of their own accord modify the terms sufficiently to make it practicable for the town to take over the undertaking; or, failing that, endeavour to persuade the Gas Company to keep them on, the town paying all costs of the award, which would after all probably be the best way out of the business." We wonder what this "Man in the Street" thinks the arbitration was for.

IMPERIAL CONTINENTAL GAS ASSOCIATION.

A Striking Comparison—Prepayment Meters on the Continent.

The Half-Yearly Ordinary General Meeting of the Association was held last Tuesday, at the Cannon Street Hotel, E.C.—Mr. J. HORSLEY PALMER in the chair.

The SECRETARY (Mr. Robt. W. Wilson) read the notice calling the meeting, and then the following report of the Directors:—

The present half-yearly ordinary general meeting of the proprietors has been convened, in conformity with the Association's Acts of Parliament, for the purpose of receiving a report from the Directors upon the affairs of the Company, and of declaring a dividend for the half year ended the 31st of December last.

The following summary shows the results of the Association's operations during that period.

The quantity of gas made during the past half year was 4556 million cubic feet; the quantity made in the corresponding half year was 4358 millions—an increase of 198 millions, or at the rate of 4·5 per cent.

The total number of lights on the 31st of December last was 2,963,239; at the close of the corresponding half year, it was 2,789,487—an increase of 173,752, or at the rate of 6·2 per cent.

The number of consumers on the books of the Association at the end of the half year was 269,454—an increase in the twelve months of 21,609, or 8·7 per cent.

The total mileage of mains in use on the 31st of December last was 1968 miles; being an increase in the half year of 57 miles.

The gross cost of coal was 1s. per ton less than in the corresponding half year; while at the same time the value of coke somewhat improved, and better prices were also obtained for both ammonia and tar, or their products, with the result that the net cost of coal was 1s. 4d. per ton less than in the corresponding period of 1902.

The profit of the half year, as shown by the balance-sheet of the Association, shows an increase of £12,490.

The plant and mains at all the stations were maintained in a due state of efficiency.

The Directors have secured a fifteen years' prolongation—*i.e.*, until 1927—of their monopoly of the supply of gas in the commune of Merxem, and have also obtained a monopoly of the supply of gas until the same date in the adjoining commune of Wilryck—both suburbs of Antwerp.

At Berlin, an exclusive concession for the supply of gas until the year 1954 was obtained from the suburban commune of Klein Machnow.

At Brussels, the Association's contract with the commune of Uccle was prolonged by ten years—*i.e.*, until 1934.

At Frankfort, the Association's concession in the suburban commune of Roedelheim was prolonged by 40 years—*i.e.*, until 1999. This includes a monopoly of the gas supply until the year 1933.

At Hanover, the Directors secured a concession from the suburban commune of Stöcken until the year 1975, with a monopoly of the gas supply until 1950.

The Directors have sold land for which there was no further use at Aix-la-Chapelle, and also disposed of the remainder of the Association's landed property at Toulouse.

At Antwerp, good progress was made with the laying of mains in the communes with which contracts have been recently concluded. Two station meters removed from Haarlem were re-erected at the Berchem works.

At Berlin, the additions to the retort power of the Weissensee works were completed. The results obtained during the past winter at the new works at Mariendorf were highly satisfactory. The construction of the dock for loading and unloading barges has been entrusted to the Government contractors for the Teltow canal, on which the works are situated.

At Brüx, one of the small Bohemian stations, the erection of the new gasholder was completed.

At Brussels, new coke conveying and breaking plant is being provided on the Koekelberg works.

For many years past, the Association has supplied the town of Lille with gas from two works—Vauban and St. André. It having been demonstrated to the satisfaction of the Directors that the supply could be more economically, and at the same time as efficiently, effected by one works, they have decided to concentrate the manufacture at the Vauban works, while the St. André works will be retained as a gasholder station only, which will be connected with Vauban by a high-pressure main. This decision has consequently necessitated the remodelling and enlargement of the works at Vauban, in which useful employment will be found for plant removed from the dismantled works at Vienna.

The Directors have to record their sincere sorrow at the loss sustained by them and by the Association through the death, on the 20th of October last, of Colonel Josiah Wilkinson, who had been a Director of the Association for 29 years. The vacancy thus created on the Board has been filled by the election of Colonel H. Le Roy-Lewis, D.S.O.

In conclusion, the Directors desire to draw the attention of the proprietors to the accounts for the half year ended the 31st of December last. These have been duly audited; and from them the Directors have, in accordance with the provisions of the Companies' Clauses Consolidation Act, prepared a scheme showing the profit of the Association for the half year, and the portion thereof applicable to the purposes of dividend which they recommend now to be declared—viz., a dividend of 5 per cent. for the half year ended the 31st of December last, payable, free of income-tax, on and after Tuesday, the 10th inst.

The Directors who go out of office by rotation are Corbet Woodall, Esq., Thomas Henry Goodwin Newton, Esq., Colonel Le Roy-Lewis, D.S.O. These gentlemen are eligible for re-election, and offer themselves accordingly.

The Auditor who goes out of office by rotation is Montagu Somes Pilcher Esq., who is eligible for re-election, and offers himself accordingly.

The CHAIRMAN said their senior Director (Mr. Newton) desired him to express his great regret at not being present that day. He had had to go to California on account of his health, and found himself unable to be back by the date of the meeting. He sincerely trusted they would see Mr. Newton in good health at the next half-yearly meeting. It was now his (the Chairman's) duty to move—"That the report of the Directors upon the affairs of the Association (which has been read) be received, adopted, and entered upon the minutes." Before this motion was formally put, he wished to say a few words concerning the business during the past half year, and also as to the position of the Company at the present time. He had really very little to report with regard to important matters in connection with their working. He must say that he felt somewhat in the position of the Israelites when

they were in captivity in Egypt, and were asked to make bricks without straw, because really nothing had occurred to disturb the harmonious relations existing between the Association and the Authorities of the different towns and districts lighted by them. They had not to report the acquisition of any very important concessions or the inauguration during the six months of any large new works. But the half year had been what he might call a placidly prosperous one—very good for the stations, very good for the engineers, very good for the shareholders, and only bad for the Chairman when he had to get up to make a speech at the half-yearly meeting. He said it had been a remarkably good half year for the engineers at the stations; and his reason for saying so was this: When the whole of the energies of the engineers were not taken up with the building of vast new works, or with the making of great additions to the existing works, and when their minds were not harassed by perpetual disagreements with the Authorities, or with conflicts with their workmen, then they were able to turn their attention to the numberless little matters connected with the gas works—the economies to be effected in all directions, improvements in the working of the machinery, looking after the gas which was unaccounted for, the improvement of the carbonizing, and various matters of that sort. And with reference to some of these matters, he should like to make an extract or two from the report which was always handed to the Directors by the Secretary at the close of every half year. He alluded especially to the gas which was not paid for. In the report, he found that the percentage of gas not paid for in the half year was 6·39, as compared with 7·3 per cent. in the corresponding period of 1902. This 6·39 per cent. included gas used on the works, which equalled 1·11 per cent. Then there was also a considerable quantity of gas supplied gratuitously for street lighting which amounted to $\frac{1}{2}$ per cent. upon the total quantity of gas made. Therefore, deducting these, the percentage of gas unaccounted for was reduced to $4\frac{3}{4}$, as compared with $5\frac{1}{2}$ per cent. in the corresponding half year. These were figures of which the Directors were very proud, of which the engineers (he knew) were proud, and of which he hoped those proprietors who were acquainted with gas matters were also proud. Then there were other directions in which economies had been effected—that was, in the carbonizing, the perfecting of the existing plant, and the adoption of the latest improvements in various classes of machinery. With regard to these things, he found, in the report from which he had already read an extract, that a few years ago they produced an average quantity of 10,470 cubic feet of gas per ton of coal carbonized, and sold 9930 cubic feet. In 1903—while observing the regulations of their contract with regard to illuminating power and calorific value (upon which, he might say, their Continental friends set great store)—they made an average of 11,100 cubic feet of gas per ton of coal, and sold 10,570 cubic feet, which represented a saving of 46,000 tons of coal. He daresay that some of the proprietors might, with these marvellous and satisfactory figures, think and ask, "Well how is it your balance-sheet does not show a larger profit?" There were various causes for this which perhaps he would be able to explain. There was, first of all, the payments in hard cash to the Municipalities. During the past half year, the sum paid to them was rather more than £51,000, which was an increase of £4300 on the sum paid in the corresponding half of 1902. Then there was also a loss—an absolute loss—on the public lighting, which for the half year represented £8400. If they added these two items together, and multiplied them by two, it would be seen that, during the course of a year, the Association were absolutely giving out of their pockets £120,000, which represented 3 per cent. dividend on their total capital. There was also another reason why their profits did not show larger than they did in the balance-sheet, and this would take some little explanation. The way in which he could best explain it was by comparing the state of the Company at the present moment with what it was a few years ago, and he would take, for his comparison, the year 1897 and that just completed. The period was only six years out of the eighty in which the Association had been in existence. But he chose 1897, because in that year they had the whole of Amsterdam and the whole of Vienna in operation, and in that year, too, the volume of the business was the highest ever recorded by the Association. At the end of 1897, the invested capital in plant and land was £4,900,000; Vienna and Amsterdam representing of that sum about £2,250,000. In August, 1898, Amsterdam was sold for its full value; and two-thirds of the business in Vienna had to be relinquished in 1899. At the end of 1903, the capital in plant and land stood at £4,700,000; so that, in six years, the Association had spent £2,000,000 in providing for the growth of their business at their many stations. During the same period, he might also mention, debentures to the amount of £376,000 had been paid off; and, of course, they had been regularly making an annual investment for depreciation account. Now just to show the proprietors that this vast expenditure in six years was necessary, he had merely to give the figures as to the number of consumers in the respective years. In 1897, they had 220,000 consumers on their books; while at the close of 1903, notwithstanding the loss of Amsterdam and the greater portion of Vienna, they had 270,000, or 50,000 more than when they were lighting those cities. At the same time, 1897 was a period anterior to the general use of incandescent lighting and prepayment meters, and so the consumers, who in that year averaged 37,000 cubic feet of gas, in 1903 averaged only 29,000 cubic feet. Of course, they, in common with all gas companies both at home and abroad, had now to largely cater for a much poorer class of consumer—that was to say, consumers who only took small quantities of gas in the course of the twelvemonth. Consequently, to earn the same gross profit, they had to employ a very much larger capital. At the same time, they had had to reduce the price of gas in some of the towns which they served, and had given greater facilities in the way of hiring out and buying burners, cooking-stoves, and various appliances of that sort. Thus the proprietors would see, they required to do a very much larger business to make the same profit as they did before. The sales of gas, however, in 1903, spread over this larger number of consumers, came to within a fraction of 10 per cent. of the total of the greatest make the Association had ever chronicled. This would, he hoped, give the proprietors an idea of the character of their business. They had now the management of 44 gas-works, and were working under no less than 214 concessions in five countries. He thought these figures spoke volumes for the way in which their staff both at home and abroad carried on this intricate and important business. He did not take any credit to the Directors for it, though, of course, they did keep their eye on everything that was going on; but he wished particularly to emphasize the fact he had just stated. There was one other thing he should like to speak about which was interesting in connection with the working of the Association. People were talking a great deal about prepayment meters in England in these days; and he should like to make some remarks as to their own experience in this respect. It was rather curious that on the Continent some towns seemed to have taken a great fancy to prepayment meters, while others appeared to have neglected them very much. It was true that the Association only started prepayment meters on the Continent in 1895, and for four years after that, the German Government (who were very careful with regard to all people under their rule) would not allow the Association to place these meters before the consumers until they could assure themselves that the meters registered exactly. After extensive experiments, the German Government allowed the Association to place prepayment meters in 1898, and the number of prepayment meters placed at all the Association's stations amounted to a total of 58,000. One town of all others with which they did business on the Continent seemed to have taken a great liking to prepayment meters—that was Antwerp, which, from the very first, had demanded prepayment meters almost faster than they could supply them. At the present time, they had in that city nearly 23,000 meters placed out of the grand total of 58,000 such meters. On the other hand, Aix-la-Chapelle lagged far behind. There, only 643 meters were placed, notwithstanding that the population was very largely industrial, though (as he was assured by their Engineer) of a shifting character. It was therefore difficult to place prepayment meters in that town to any great advantage. Other towns, however, seemed to be going ahead very well. At Berlin, they had 6105 fixed; at Frankfort, 7248; and at Hanover, 6064. With regard to the immediate future, they had to report that at Berlin, the second section of the new works at Mariendorf was being proceeded with. Operations had already been commenced in connection with the dock on the new canal, whence they would be able to unload coal straight into their works, as well as in connection with the extensive coal-handling plant that would be required there. The contract for the second holder at Mariendorf (which would be the largest on the Continent, consisting of three lifts, and having a total capacity of more than 5 million cubic feet) had been tendered for, and the contract obtained by a Berlin firm. The figures regarding the tenders were rather curious just now, when fiscal policy was so much in the air. The Directors asked the leading English gasholder firms to tender, as well as the leading Continental ones. The successful German firm's tender for the holder, delivered and erected on the land at Mariendorf, was £24,700. The lowest English tender was £24,698—£2 below that of the German firm; but, unfortunately, it was not for the holder delivered and erected at Mariendorf. It was to be delivered at an English port; and the Association would have had to pay the freight and duties, which would have amounted to some £7500. He was afraid the English tender was, therefore, completely "out of it." He might say the firm to which they had given the contract was a perfectly reliable one, who had done a large amount of first-class work for the Association all over the Continent. At Antwerp, Frankfort, Brussels, and Hanover, large extensions had still to be made in the future to meet the increasing demand for gas; and so they would soon have passed the figure for plant and land to which he had referred as having stood in their books in 1897. He did not think he had anything more of interest to tell the proprietors with regard either to the working of the half year or as to the position of the Association at the present time.

The DEPUTY-CHAIRMAN (Mr. Arthur Lucas) seconded the motion.

Mr. YELD asked what the payments to the Municipalities represented to which the Chairman had referred in the early part of his speech.

The CHAIRMAN replied that they represented the payment in hard cash or in gas for public lighting free of cost, in accordance with the terms of the contracts entered into by the Association, and might be considered as the price paid by the Association for the privilege of carrying on their business. As he had already stated, the payments amounted in the half year to £51,000, and the value of the gas to £8500; so that these sums equalled nearly £120,000 in the year.

Mr. CRAWFORD asked whether this amount included any sum paid in the way of rates. He supposed on the Continent companies like this one did not escape being rated any more than those in England.

The CHAIRMAN said the sum he had mentioned was in addition to what they had to pay for rates and taxes. The Secretary informed him that they paid almost an equivalent amount in this way.

The motion was unanimously carried.

The dividend recommended in the report having been declared,

On the motion of the CHAIRMAN, seconded respectively by the DEPUTY-CHAIRMAN and by Mr. CLARENCE PIGOU, Mr. Newton and Mr. Corbet Woodall were returned to their seats at the Board. Proposing the re-election of the new Director (Colonel Le Roy-Lewis), the CHAIRMAN remarked that it was only after considerable thought and care that Colonel Le Roy-Lewis was asked to join the Board. He had great linguistical capacity, and considerable leisure to devote to the interests of the Association. From what he (the Chairman) had seen of their new colleague, he would make a valuable addition to the Board. The proposition (which was seconded by Sir CHARLES JESSEL) was unanimously adopted.

The retiring Auditor (Mr. M. S. Pilcher) was re-appointed, on the motion of Mr. BEDDINGTON, seconded by Mr. H. D. PILCHER.

Mr. CORBET WOODALL remarked that, after the speech they had heard from the Chairman, the proprietors would understand the pleasure with which he rose to propose that the best thanks of the meeting be given to the officers of the Association. With regard to the officers in London—Mr. Wilson and those under him—they knew quite well that the Board could not say anything more than they felt with regard to them. They saw Mr. Wilson and his staff constantly, and knew how admirably the work of the Association in London was performed by them. Regarding the officers on the Continent, one felt more easy

in proposing this resolution at the other half-yearly meeting when they were not present. But it was a great satisfaction to hear, as the Board did frequently, of the good relations which existed between the Association and the Municipalities of the various towns, which were of very varied character; and the Directors believed and knew that this was due almost entirely to the excellent diplomatic conduct of their officers abroad. To him, he need hardly say, it was a peculiar pleasure to propose this resolution, because, having been a member of the staff himself, he knew the cordiality with which all the members worked together, with just the one rivalry as to who should do the best for the Association, but all were prepared to rejoice in the success each of the other. They had every reason to be thankful that they had such an excellent and representative staff on the Continent.

Mr. J. H. BIRCHENOUGH seconded the resolution with great cordiality; and, in a similar spirit, the proprietors endorsed it.

Moved by Mr. M. S. PILCHER, and seconded by Mr. BEDDINGTON, the proprietors also heartily marked their appreciation of the services of the Chairman and Directors.

The CHAIRMAN's acknowledgment concluded the proceedings.

BUENOS AYRES (NEW) GAS COMPANY, LIMITED.

Purchase of the South Barracas Gas Company's Undertaking.

The Annual General Meeting of this Company was held last Wednesday, at the London Office, No. 1 East India Avenue, E.C.—Mr. F. J. HESELTINE in the chair.

The SECRETARY (Mr. J. M. Macmorran) read the notice convening the meeting.

The CHAIRMAN, in moving the adoption of the report and accounts, said that, when calling the attention of the shareholders at the last meeting to the expansion that was taking place in the business, and to the satisfactory accounts then presented, he ventured to predict that the results for 1903 would prove equally successful. The shareholders would therefore understand what a pleasant task he had before him that day, seeing that his prediction had not been falsified. This was due, in some measure, to economy in manufacture; but more particularly—and he wished them to mark this—to the increase in the sale of gas. This was very gratifying; for, although the adoption of the incandescent mantle of necessity reduced consumption, the quantity of gas sold in 1903 was 7 per cent. more than in the preceding year. This increase had steadily continued during the last four months, and up to the present time. The profit for the year was £67,823 after writing off bad debts, making provision for doubtful ones, and deducting all expenses of management, as well as the payment of taxes (which by-the-by amounted to £11,760, or above 2¼ per cent. on the total share capital), and spending £15,740 on upkeep. To this profit must be added the £10,812 brought forward; making £78,635, which the Directors proposed to deal with as follows: To pay (free of income-tax) a final dividend of 8s. per share, which, with the interim dividend of 6s., made a total dividend of 7 per cent. (or 14s. per share) for the year. This would absorb £35,000. It was also proposed to place £10,000 to reserve, and £5000 to renewal fund, to write off the usual annual instalment of £2112 from discount and expenses *re* issue of debenture stock, and to carry forward £16,522. Possibly some of the shareholders might think the Directors were much too conservative in dealing with profits. To place £20,000 to reserve in the short space of two years, and to create a renewal fund of £5000 might seem out of proportion to the requirements of so small a capital as that of the Company; but the Directors were pursuing what they all of them believed to be a wise, sound, and well-thought-out policy. The past year had been a busy one, both in London and at the works. In the summer of last year, their Secretary (Mr. Macmorran) spent some weeks at the works and offices in Buenos Ayres; and this visit had been productive of benefit, for not only did he gain much information with regard to the property and its working, but, by the interchange of views, and being brought into personal contact with each member of the Committee of Management and staff, the cordial relations which the Directors always desired should exist between the executive and the representative of the Board in London were, he believed, firmly established. Mr. Macmorran's confirmation of the opinion the Board held of the efficiency to which the works had now been brought and maintained, gave them great satisfaction, as it doubtless would the shareholders. Following on this visit, the Directors summoned Mr. Obarrio (their Manager) to London, so that he might study the improvements that had been made, and were almost daily taking place, in the gas industry here and on the Continent. The Company's efforts to encourage the use of gas for power, cooking, and heating had met with considerable success, notwithstanding the high and useless illuminating power which they were obliged under contract to supply. The waste involved in producing a gas of unnecessary intensity would, he felt sure, be borne in upon the minds of all concerned at no very late date; and it was on this account that the Board invited their Manager, who was keenly alive to the importance of the subject, to come over and inspect the most up-to-date works here and on the Continent, so that he would be prepared to meet any change that might occur. Mr. Obarrio spent some six months in this investigation; and the result would be greatly to the benefit of the Company. From the report it would be seen that, during the year, there was a net increase of 1261 meters, as against 881 in 1902. This was a larger gain than for some years past; and as the sales of gas were considerably larger than those of 1902, it was one of the most satisfactory features of the year's working. It showed that, in Buenos Ayres as in England, the check on consumption due to the introduction of the incandescent mantle was of a temporary character. Of main laying, sufficient was done to open up such districts as would render the expense incurred remunerative. Owing to the improvement in the method of manufacture, and to the increased demand for gas, 5500 tons more coal were carbonized than in 1902; but no difficulty was experienced in any department in handling this increased tonnage. The storage capacity for coals was now 12,500 tons, and for oil 1100 tons. The yield of gas per ton of coal carbonized was quite equal to the best returns in Europe. A market was found for the residuals, though at a somewhat reduced price. Further extension being found necessary in the inclined retort benches, three empty beds had been fitted up, and the furnaces built with Drake's patent tubular system. These settings were giving great satisfaction. A new coal breaker and conveyor, together with a duplicate gas-engine, had been erected, as well as a new Holmes washer and benzol plant. The condensers were also being extended; and four new overhead purifiers, with elevating machinery, were now in course of erection. In fact, nothing, so far as the Directors knew, had been left undone to keep the works up to the highest state of efficiency for meeting the increased demands upon them. The high-power intensive gas-lamps which the Company had introduced were obtaining customers; and the 6471 public lamps lighted by them for the Municipality had been nearly all converted to the incandescent system, and were giving universal satisfaction. With regard to the general condition of affairs in the Argentine, the large harvests, both last year and this, had imparted a great stimulus to business in all its branches; and there appeared to be every prospect of the continued prosperity of the Company. Coming to the question of the acquisition of the South Barracas Gas-Works, he said he might mention that, before the end of next month, the Company had to determine the course they would take in this matter. Assuming that the shareholders agreed with the Directors that the idea of abandoning the leases of the Barracas and Lomas works was not for a moment to be entertained, there remained two alternatives—the one, to renew the leases for another term of fourteen years; the other to exercise the option to acquire outright the rights and interests of the South Barracas Company. The Directors were unanimously of opinion that the latter course should be adopted. The amount standing against the Barracas and Lomas works up to the date of the last audited balance-sheet was approximately £69,666, of which £27,923 was covered by debentures, either issued or to be issued, to the Buenos Ayres Company principally in respect of the Lomas extension. The amount earned by the Barracas works did not cover the guaranteed dividend of 6 per cent. till March, 1895; but from that date the surplus had continually increased, until in 1898 it exceeded £1600. The Lomas extension was not completed till 1899, after which date the expenditure and receipts of both Barracas and Lomas were pooled in accordance with the contract. The Directors believed that before long the earnings would show a surplus at least sufficient to pay a dividend upon the capital issued for the purchase. The agreement of March, 1890, was fair in the interests of both Companies. It gave the Buenos Ayres Company the advantage of fourteen years' actual experience before committing them to a purchase; and it was in the light of this experience, and the very favourable anticipations it enabled the Directors to make of the future, that, at the extraordinary meeting to follow the present one, a resolution to purchase would be submitted.

Mr. J. C. IM THURN seconded the motion, which was agreed to.

The CHAIRMAN proposed that Mr. J. C. im Thurn be re-elected a Director; remarking that they had both worked together on the Board for thirty years.

Mr. ROSS PINSENT seconded the proposition, which was passed.

Moved by the CHAIRMAN, and seconded by Mr. F. C. IM THURN, Mr. Robert Nesham was also re-elected to his seat on the Board.

Resolutions were passed, heartily thanking the Local Committee, and the officers and their staffs both at home and abroad—Mr. F. S. G. PILLEY, who seconded the motion, making special reference to the "very effective and satisfactory visit" the Secretary had paid to Buenos Ayres.

AN EXTRAORDINARY MEETING.

The SECRETARY read the notice of the Extraordinary General Meeting which had been convened for the purpose of passing the necessary resolutions in connection with the acquisition of the undertaking of the South Barracas Company.

The CHAIRMAN said the Board were so satisfied that the proposals embodied in the resolutions were such as should be carried out in the interests of the shareholders, that he had much pleasure in submitting them. The first resolution (which he moved) gave the Directors authority to exercise, at their discretion, the option given to the Company, by agreements dated March 13, 1900, Aug. 4, 1898, Oct. 11, 1898, and March 20, 1900, "to purchase the properties therein mentioned upon the terms and conditions therein expressed, with any modifications they may think it expedient to arrange."

Mr. ROBINSON seconded the motion, which was adopted.

The CHAIRMAN, replying to a question, explained that a concession was granted in 1889 by the Municipality of South Barracas for the supply of gas within their district, and for the erection of the necessary gasholders and works upon land already acquired. As the district was directly to the south of that lighted by the Buenos Ayres Company, the Directors thought it would be undesirable to allow the rights and privileges granted by the concession to pass into other hands. Accordingly the Company assisted in the formation of the South Barracas Company, and in March, 1890, entered into an agreement for a lease of the undertaking for a term of fourteen years from Dec. 31, 1890, with an option of purchase at the expiration of the term. Proceeding, he said the shareholders had given the Directors power to buy; but they had not given them any money to buy with. In order to carry out the agreement, it was necessary the capital of the Company should be increased; and he moved—"That the capital of the Company be, and is hereby, increased from £500,000 to £600,000 by the creation of 10,000 new shares of £10 each."

Mr. H. SHEERMAN seconded the motion, which, after a little discussion, was also unanimously carried.

Moved by Mr. SHEERMAN, and seconded by Mr. HORN, a hearty vote of thanks was passed to the Chairman and Directors.

The CHAIRMAN, in replying to the vote, mentioned that the Directors had received proxies from 165 shareholders (representing about £140,000) who desired that the purchase should be carried out.

BOMBAY GAS COMPANY, LIMITED.

Modernizing the Affairs of the Undertaking—The Price of Gas.

The Ordinary Meeting of this Company was held last Thursday, at the London Offices, No. 6, Drapers' Gardens, Throgmorton Avenue, E.C.—Mr. H. E. JONES in the chair.

The SECRETARY (Mr. J. H. Perrins) having read the notice convening the meeting, the Directors' report and the accounts were taken as read.

The CHAIRMAN said he had, in the first instance, to refer to the fact that he was addressing the shareholders instead of their worthy Chairman (Mr. Robert Davidson). He regretted to say that Mr. Davidson was still not well enough to attend this meeting. He (the Chairman) had next to draw attention to the change in the form of the accounts. It would, he said, be noticed that they no longer carried out the accounts as if the rupee were 2s., and then showed a great correction at the end of the accounts under the heading of exchange, which, in last year's accounts, was a considerable sum—£16,753. In these accounts, they had converted the rupee into the English value, or as near as they could do it in round figures, of 1s. 4d. This got rid of the item of exchange; but in a rather peculiar manner it brought a special kind of charge on to this year's accounts, because they had a large standing balance of book debts in Bombay which, formerly, they carried into the account at the full rate of the rupee. Now, to be consistent, they had to carry that to the credit of the account at the diminished value of 1s. 4d. They had therefore converted that account, and had faced it on this side once for all. It would not happen again; but it showed the exceptional disadvantage this year of £3178. It was not a real disadvantage, because its value was more or less of a pleasant fiction, as it never could have come to England without being abated by exchange. Then, again, when they looked at the items of expenditure or receipts, it was much better to have the figures nearer sterling value than for them to have to make an elaborate calculation of each item separately to get at the truth. The report stated that the Directors were gratified to announce a considerable improvement in the sales of gas. The increase in the private consumption this year was 3½ million cubic feet, which was about a 5½ per cent. advance upon the previous year's record; and, in addition to this, there were now about 43 more public lamps in use. There was a reduction in the sum paid for coal, partly owing to the price having gone down generally, and partly because they had been able to find some cheaper coal—though not very much cheaper—some of which was Indian and some Australian. In these matters, the Directors were, of course, constantly looking out to see what improvements they could make to obtain a reduction in the manufacturing cost of gas. Coke was slightly less; and this was partly due to the fact that they did not use coal so extravagantly, through having a better quality. The receipts for tar were also less. Touching on the matter of the exchange account, instead of the large debit that they formerly had under this head, there was a small credit of £278. Those who looked closely into the account would find that this represented the difference on the remittances at 1s. 4d., because exchange had been a fraction above that all the way through. It was not easy to compare the items of expenditure in these accounts with those of last year, because they were somewhat differently grouped; and the shareholders would readily see the advantage of the new system of grouping. The Chairman explained the change at some length; and it amounted to this, that, though for obvious reasons they did not give the accounts quite so fully as under the English system, they had assimilated them to that form as closely as they prudently could. But he wished the shareholders to understand that the alteration was not the result of any whim on the part of the Board, but because they thought it wise to approximate the accounts with the English standards; and so, from this time forth, they would have a better expressed and more comparable form of account. However, the profit (including the £462 brought forward) amounted to £18,820; and this was subject to the abatement of the £3178—the difference in the value of the outstandings in Bombay at 2s. compared with the net value at 1s. 4d. The balance, however, was extremely satisfactory; and it enabled the Directors, after making this large provision, to recommend a dividend of 3½ per cent.—making 6½ per cent. for the year. This was not a grand return for a gas company. But Bombay had been subjected to the bubonic plague, which had made a considerable difference to the prosperity of the city from a trade point of view. They were now improving the works—especially the carbonizing plant, in which they were introducing a better kind of furnace, which would result in an economy of fuel. This brought him to a point that was very near the Directors' hearts, particularly since they had had sitting among them their old General Manager in Bombay (Mr. Louis Penny), who gave them very valuable local information—that was, the question of a possible reduction in the price of gas. It was very easy to recommend gas shareholders who were getting (as many of them did in England) 7, 8, and even more per cent. upon the older classes of stock, to make a reduction in the price of gas; but it was not such an easy thing when shareholders were only getting for one half of the year a 3 per cent. return. But he had never felt more strongly in his life than he did in the case of the Bombay Gas Company that there should be a reduction in the price of gas. It had not been reduced since as far back as 1876; and the price now represented in English figures, as converted at 1s. 4d., was 8s. per 1000 cubic feet. He wanted the shareholders to consider how much the prosperity of gas companies in this country and on the Continent depended upon the use of gas for industrial purposes and cooking and heating; and this was due entirely to the fact that the price of gas was low. They had sent out to their Manager in Bombay numberless catalogues and specimens of the great variety of stoves and appliances used in the arts and manufactures in England; but so far they had met with very limited success in Bombay. The Board thought they would make the adoption of these things much more general, and develop the gas more effectually, if they reduced the price. They were therefore intending, subject, of course, to the shareholders' support, to face a reduction of half-a-rupee, which corresponded in this country to 8d. per 1000 cubic feet. Out in Bombay, however, owing to the value of the silver currency, it would give even to the man who used a small quantity of gas, 1s. per 1000 cubic feet. This might possibly result in the first year—he did not think it would, and could nearly guarantee that it would not—in a reduction of the dividend of perhaps ½ per cent. But they might take it from him that the reduction in price would be one of the soundest and wisest steps they could take for securing the permanent stability and prosperity of the undertaking. Nothing less than 1s. per 1000 cubic feet where the price of gas was 8s. would be effectual in the opinion of Mr. Penny and the other members of the Board. Then, in another two or three years, when they had brought the dividend up to the present position, or beyond it, the Board might come to the shareholders with a suggestion for a reduction of another half-a-rupee. He trusted that the Directors would have the moral support of the shareholders in taking a step which was momentous in the interests of the Company. It could not possibly injure the shareholders more than by a fraction of 1 per cent.; but he could not help thinking that their reserves in other matters, and the tendency of a reduced price to increase the business, would carry them through, and enable the Board to meet the shareholders next year without having interfered with the dividend. He concluded by moving the adoption of the report and accounts, and the declaration of the dividend.

Major W. F. GORDON seconded the motion.

Mr. A. SUART expressed his approval of the changes made in the accounts; and as to the lowering of the price of gas so as to enable the Company the better to compete with oil, he thought that, instead of reducing the dividend, it would tend to raise it.

Mr. W. CUFF also approved of the actions of the Directors in these respects; and it appeared to him they could safely reduce the price, and yet maintain the dividend.

The motion was unanimously carried.

Proposed by Mr. E. A. FLINDERS, and seconded by Major GORDON, Mr. Louis Penny was returned to his seat at the Board, as was also Mr. R. Davidson, on the motion of the CHAIRMAN, seconded by Mr. PENNY.

Moved by Mr. J. STEWART, and seconded by Mr. CUFF, the Auditors (Messrs. Magnus Ohren and G. E. Robinson) were reappointed.

Mr. MAGNUS OHREN acknowledged, on behalf of himself and his colleague, the confidence of the shareholders.

Mr. SUART moved a hearty vote of thanks to the Chairman and Directors; and Mr. T. SMITH seconded, remarking that he was pleased to see that the Directors had conformed the accounts as nearly as possible to the English style. He also approved of their action in wiping off at once the depreciation of the value of the outstandings in Bombay, instead of spreading it over several years.

On the proposition of Mr. STEWART, seconded by Mr. CUFF, the officers and staffs at home and abroad were also cordially thanked.

The CHAIRMAN remarked that they had in Mr. Perrins a most careful and faithful officer. Their Engineer and Manager (Mr. F. W. Chamberlain) was making his mark in Bombay, and was adding to the number of the consumers. In thanking the shareholders for their vote to the Directors, he said it gave the Board double pleasure to find that the shareholders so thoroughly supported them in their efforts to improve the position of the Company.

Mr. PERRINS also acknowledged the vote to himself, Mr. Chamberlain, and the staffs in London and Bombay.

SOUTHAMPTON GAS COMPANY.

Half-Yearly Meeting.

The Half-Yearly Meeting of the Company was held last Wednesday, under the presidency of the CHAIRMAN (Captain Corse Scott, J.P.).

The Directors' report stated that the profit and loss account showed that, after payment of debenture interest and all other charges, the amount available for dividend was £21,732. They recommended the payment of maximum dividends, amounting to £11,756 for the half year on the ordinary stock (less income-tax). This will leave the sum of £9976, from which £5000 has been invested to augment the reserve fund, which now stands at £27,195; while the balance of £4976 is carried forward. There was the satisfactory increase of 18,816,000 cubic feet of gas sold during the half year, as compared with the December half of 1902. The number of consumers on the prepayment meter system now amounts to 9500. There are at the present time over 2950 ordinary gas-cookers on hire; and in addition a large number of gas-fires are being used. The Directors had to report with much regret the death of the late Chairman (Dr. T. W. Trend, J.P.), which occurred in December. He had for many years taken a great interest in the affairs of the Company. Mr. J. B. Paddon, the Consulting Engineer to the Company (owing to advancing years), resigned his appointment. The works are a substantial and satisfactory evidence of the valuable services rendered by him for a period of 38 years. The post vacated has been filled up by the appointment of Mr. Joseph Cash. Mr. C. Crowther Smith, who for nearly 39 years has been Secretary of the Company, intimated his desire also to retire from March 31. While deeply regretting the necessity for such a step, the Directors, in accepting his resignation, placed on record their appreciation of his faithful and valuable service; and in order to retain this for the benefit of the Company, they appointed him to a seat on the Board in the place of Dr. Trend. In addition to this, they decided, subject to the approval and sanction of the stockholders, to grant him a superannuation allowance of two-thirds of his salary—viz., £466 per annum. From among a number of applicants for the post of Secretary, the Directors appointed Mr. E. W. H. Eady (who for 28 years has been in the service of the Company), at a salary of £400 per annum.

The CHAIRMAN, in moving the adoption of the report, said the proprietors were to be congratulated upon the successful results of the half-year's working. During the six months, over 309 million cubic feet of gas were sold, as compared with 290½ millions in the December half of 1902, or an increase of 6½ per cent. The amount of the gas and meter rental for the half year was £51,342; being an increase of

£3577. The Directors were glad to call the attention of the proprietors to the decision of the Corporation to substitute incandescent burners in the public lamps for the old flat-flame burners. In consequence of this change, the streets were now lighted both adequately and economically. The use of gas for motive power—in driving gas-engines—for cooking purposes, for gas-fires, and for consumption by slot meters, was steadily increasing in a satisfactory and encouraging manner. As a step towards the equalization of the price of gas charged within the county borough of Southampton, as provided for in the Company's Act of 1898, the Directors had resolved, after the consideration of the matter and a conference with a deputation from the Borough Council, to reduce the price 3d. per 1000 cubic feet (after the taking of the Midsummer quarter's indications) to the ordinary consumers in the added areas and in portions of Portswood—making the charge 3s. 1d. in such places. Notwithstanding the fact that the Directors had the pleasure of submitting a satisfactory report as to the position of the Company, they could not ignore the fact that the undertaking was very highly rated; 2d. of the price received per 1000 cubic feet sold having to be expended on rates and taxes—the total sum so paid in 1903 being £5177. He concluded by referring to the death of the late Chairman and the official changes notified in the report.

The motion was carried unanimously, after which the payment of the maximum dividends was sanctioned, the superannuation allowance to Mr. Crowther Smith was agreed to, and the salary of the new Secretary (Mr. E. W. H. Eady) was fixed at £400 per annum.

The proceedings concluded with votes of thanks to the Chairman and Directors and the Engineer (Mr. S. W. Durkin) and staff.

PRICE OF GAS AT MANCHESTER.

The Reduction Agreed To.

A Meeting of the Manchester City Council was held last Wednesday to consider, among other matters, the financial situation arising from the increased demands on the part of several of the Committees and the decreased contributions by the trading departments.

Alderman GIBSON, in the course of the proceedings, stated that, as the result of a conference with the Electricity Committee, it had been agreed that Piccadilly, in front of the Infirmary, should be lighted by electricity; and that in other streets around the Infirmary intensified gas lighting should be used. He also drew attention to the proposal that the wages of general labourers and other classes of men now employed at the Gaythorn, Rochdale Road, and Bradford Road gas-works at the rate of 3s. 1od. per day, or 23s. a week of 54½ hours, be advanced to 25s. a week (equal to 5½d. per hour). When this alteration was made, the wages paid by the Gas Committee would be equal to those paid by any other corporation or gas company in the country. Subsequently, he moved the adoption of the Committee's recommendation (which was noticed in the "JOURNAL" for the 26th ult.) to reduce, as from June 24, the price of gas to ordinary consumers, including the public lamps, by 2d. per 1000 cubic feet—namely, from 2s. 6d. to 2s. 4d. in the city, and from 2s. 9d. to 2s. 7d. outside. He said that in 1890, when the price of coal was considerably enhanced, in order that the Committee might continue to give £50 000 in relief of the rates, the price of gas was raised 3d. per 1000 cubic feet; and in 1891, when the price of coal was still high, the price was advanced a further 3d. It was well understood, almost to the extent of a promise, that when the price of coal came down, the price of gas should follow. It was, however, not until last year that a reduction of 3d. took place in the price of gas; and now that coal seemed likely to be lower than it had been for many years past, the Committee wished to give the consumers the benefit to the further extent of 2d. per 1000 cubic feet.

Alderman BRIGGS seconded the proposal.

Alderman RICHARDS said he did not object to a reduction of the price of gas; but he asked whether the time was opportune—seeing that the rates threatened an increase of 8d. in the pound—for them to give £27,000 away to the public. By the proposed reduction, they would be throwing away £27,000. (No, no!) Well then, who would benefit?

Mr. SUTTON: The gas consumers.

Alderman RICHARDS said that, at any rate, the penny-in-the-slot consumers would not get anything. He (Mr. Richards) would benefit; but he would more than pay back the amount of benefit in the increased rates. Did they think the landlords would accept an increase of the rates, to the extent foreshadowed, without raising the rents to their tenants?

Mr. SUTTON supported the motion. He said it was only fair that the gas consumers should have the advantage of the lower price of coal, seeing that they had to pay so much more when it was dear.

Mr. JONES pleaded for £70,000 from the Gas Committee.

Mr. PLUMMER pointed out that if the Gas Committee did as Mr. Jones suggested, they would practically be lighting the public lamps for nothing; as they received £71,000 a year under this head.

Mr. TREVOR said that to go wringing all the gas profits from the consumers, and paying them to the relief of the rates, was a spurious kind of co-operation, which charged too much for an article and then gave dividend back.

Mr. BROADHEAD suggested that the reduction in the price of gas should be confined to consumers within the city.

Alderman MAINWARING said that in Manchester 50 per cent. of the ratepayers were consumers; and no less than two millions and a half of money had been extracted from their pockets for the benefit of the ratepayers. When the Gas Committee could show that it was to the interests of the ratepayers to reduce the price, the Council should listen to the request. It was a shame that the citizens of North Manchester, who were principally gas consumers, should be asked to pay for the relief of the taxation of those in the centre of the city. He hoped the Council would agree to the Committee's proposal.

Mr. WILSON thought the money ought to go towards the reduction of the rates, so as to relieve the greater number.

Alderman VAUDREY said they should consider the proposal quite apart from the question of the increase in the rates. The gas charge in Manchester seemed to be considerably higher than in the other large commercial towns of England. It ought to be the policy to reduce the gas price by 2d. per 1000 cubic feet, and also to hand over £50,000, or even £60,000, towards the relief of the rates.

Alderman GIBSON, in reply, said he was quite certain that every penny which the Gas Committee had paid in relief of rates had come from the consumers, and not out of the pockets of the ratepayers as ratepayers; and therefore, if they wished to relieve the greatest number, let them relieve the 150,000 consumers. If they sent back the estimates of every Committee, he had reason to believe they would get 4d. knocked off the rates. Regarding his own Committee, he said they had a respectable contingent fund, to which they had intended to add, in round figures, about £8000. They had also put £13,000 away for the purpose of future building; and, if the Council liked, they could have the £8000 that was going to the contingent fund, together with £2000 from the sum of £13,000 named, in addition to the £50,000 they had already promised towards the relief of the rates.

On being put, 60 voted for and 24 against the resolution, which was therefore declared carried.

At a meeting on Friday, the Gas Committee decided to contribute £60,000, instead of the £50,000 previously agreed upon, to the relief of the rates—thereby confirming the promise made by Alderman Gibson to the Town Council.

GAS COAL CONTRACTS AT ROTHERHAM.

In submitting the minutes of the Gas Committee at the last meeting of the Rotherham County Borough Council, Alderman Gummer dealt at length with the operations of the department for the past year. He said the gross profits had been £13,480, which only worked out at 6½ per cent. on the capital of the undertaking. After paying for loans and other charges, there was a net profit of £3665; and out of this they provided light for the lamps of the Highway Department, which left a surplus of over £800, which the Borough Comptroller thought would be better left for any requirements that might crop up during the year. There had been a slightly increased make of gas—280,682,000 cubic feet, as compared with 265,073,000 feet last year, or an increase of 6 per cent. The reason why, with the increased make, there was not a greater profit, was that unfortunately there was more leakage in the Thorpe and Scholes district. The leakage for the past year was 12½ per cent., as against 8½ per cent. in the previous twelve months. This amounted in money value to £1200; and if they added to it nearly £400 spent in labour and repairs, they got £3655 lost in leakage, against £2054 the year before, or a difference of £1601. They would otherwise have had a net profit of £5266, and the undertaking would have come out much better than it did. Yet, in his opinion, it did not do what it ought with the capital invested, and the work and care they tried to take in managing the department. The figures pointed to the larger consumers adopting the electric light. Coal had cost £15,462, against £15,403. The average price, including cannel, was 12s. 6½d. per ton, against 13s. 3d. per ton; so that they had had a slight saving during the year. Cannel had cost 3s. per ton less. The cost of coal at the local pits had averaged 11s. 8d. per ton. He pointed out that at the Sheffield Gas-Works coal had cost 8s. per ton, and went on to argue that the price of coal seriously interfered with the financial results at Rotherham. They consumed 25,000 tons per year, and at 3s. per ton less price he would have had very handsome results to report to the meeting. They had this difficulty to face; and he commented on the disposition there had been among members of the Council to give orders for coal to local collieries, because their workmen lived in the borough. It was unfair to the working men that they should pay high rates for the idea that by paying higher prices to the coalowners for coal they were conferring a benefit upon the town. He did not think the giving of the tenders to the local collieries made very much difference to the working men of the town. There had been more labour employed at the gas-works during the year. Wages paid amounted to £11,976, or an increase of £963. Cookers had come more into use, and numbered 2263, as compared with 1797. The increase in the number of consumers was 475; and the greatest demand on their resources in any one day had been 1,344,000 cubic feet. They had at the present time plenty of reserve power, which they hoped in the near future fully to develop. They could turn out 25 per cent. more gas with the present plant. He concluded by urging the Council to seriously consider the question of the cost of coal.

In the course of the discussion which followed, Alderman Hickmott expressed the opinion that by their determination to give the coal contracts to the local collieries, the Corporation were wasting money; while Mr. Heminsley did not believe the working men would be prepared to sanction any method to bring them a little bit of employment that would also involve the payment out of their pockets of extraordinary prices for coal. Mr. Bryant said Alderman Gummer had put the position of things unfairly with regard to the coal contracts, and that the quality of coal supplied was productive of the best results.

The minutes were approved.

A Big Water-Works Contract at Barrow.—The Barrow Town Council last week rejected the recommendation of the Gas and Water Committee to accept the tender of Messrs. John Aird and Sons for the construction of the Seathwaite Tarn dam and a road in connection with the Duddon Water-Works, at prime cost, *plus* 10 per cent. and reasonable allowance for the use of contractors' plant and machinery. The Council discussed the matter in Committee for two hours, and finally resolved that the work should be given to Messrs. Kennedy, of Glasgow. The price was not stated; but it is expected that it will amount to £50,000 or £60,000.

THE EXAMINATIONS IN GAS MANUFACTURE.

The City and Guilds Question Papers.

We give below the question papers set at the examinations in "Gas Manufacture" recently held under the auspices of the Department of Technology of the City and Guilds of London Institute—the Examiner, as in recent years, being Dr. Harold G. Colman. At the top of each paper were printed the following instructions: "The candidate must confine himself to one grade only, the ordinary or honours, and must state at the top of his paper of answers which grade he has selected. He must not answer questions in more than one grade. If he has already passed in this subject in the first class of the ordinary grade, he must select his questions from those of the honours grade."

HONOURS GRADE.

1. Discuss the comparative merits and demerits of (*a*) horizontal retorts provided with coal-elevating, charging, and drawing machinery, and (*b*) inclined retorts provided with coal-elevators and the necessary charging apparatus. 2. A bed of retorts, generator-fired and provided with regenerators, which had previously been working well and uniformly, is found, after a time, to be heating unevenly, the temperature being very high in and around the combustion chamber, but too low in the rest of the setting. (*a*) How would you ascertain the cause of the bad working? and (*b*) how would you proceed to put matters right? 3. Explain, with the aid of sketches, the construction of, and method of fixing, the ironwork required for bracing a bench of retorts, showing also the manner in which the mouthpieces and hydraulic main are supported. 4. Explain, with the aid of sketches, the construction and action of any one form of rotary washer. 5. Describe in general outline any process which has been tried on the large scale for effecting the removal of carbonic acid and sulphuretted hydrogen from crude gas by the action of ammonia in closed vessels. 6. State concisely how you would ascertain the value of a sample of coal for gas-works purposes, mentioning the different points which should be determined. 7. Describe any one method which is in practical use for recovering the cyanogen compounds present in crude coal gas. 8. How would you systematically ascertain that the pressures in the mains throughout the district were maintained at a sufficient, but not excessive, height? What steps would you take to remedy a deficiency in any part of the district? 9. Describe any one of the high-pressure systems of incandescent lighting. What special precautions must be taken in fixing incandescent burners when used for street lighting? 10. How would you determine the "gross" and "net" calorific power of a combustible gas? What is the relation between the calorific power and the total potential energy of the gas?

ORDINARY GRADE.

1. Sketch the construction of a generator furnace for heating a bed of retorts. What precautions would you take in working it to ensure good results? 2. What is the cause of the formation of carbon or "scurf" on the retort walls, and how is its removal effected? 3. Describe (*a*) the hydraulic main and its uses, and (*b*) the "anti-dip." 4. Describe, with the aid of sketches, the construction of any one form of atmospheric condenser. 5. Why is it desirable to remove all sulphuretted hydrogen from the gas before sending it out from the works? How is the removal usually carried out? 6. Sketch the construction of a tower scrubber. What steps would you take to maintain it in efficient working order? 7. Explain the principles upon which the determination of illuminating power depends. How would you calculate the illuminating power with a bar photometer in which the scale was only graduated in inches? 8. What advantages are obtained by the use of an exhauster? 9. Sketch the construction of an incandescent burner. Of what materials is the mantle composed? 10. Why is it necessary to ascertain the height of the barometer and temperature in determining the volume of a gas? What is the meaning of the term "corrected for temperature and pressure," and how is this figure arrived at?

In the ordinary grade, 39 marks were allowed for Nos. 1, 4, 6, and 7, and 36 for each of the rest. In the honours grade, 39 marks were allowed for Nos. 1, 2, 4, and 8, and 36 for each of the rest. Four hours were allowed for each paper; and not more than eight questions in either grade were to be attempted.

The Polytechnic Question Papers.

The following were the questions set at the Polytechnic, Regent Street—where the classes in "Gas Manufacture" are conducted by Mr. Walter Grafton, F.C.S.—at the examinations on the 20th ult.:—

HONOURS GRADE.

1. Describe the construction and working of a setting of inclined retorts, and state what advantages are claimed for this method of carbonizing coal over the horizontal type. 2. What ought to be the chief duty of the condenser, and the object of the method of reversing the current of gas passing through it? 3. Sketch the construction of a tar-extractor, and explain its working. Name a good type. 4. How and by what means would you test gas for its heating value? What is the net B.T.U. of so-called 14 and 16 candle gas? 5. Describe a carburetted water-gas plant, illustrating your answer with sketches. 6. Describe the process of dry purification for the complete purification of illuminating gas. 7. Explain, with the aid of sketches, the construction of a gasholder guided by means of wire ropes, and state what advantages can be claimed for the system. 8. Of what does coal gas, water gas, and Mond gas consist? Classify the gases as (*a*) illuminants, (*b*) diluents, and (*c*) heat-producing.

ORDINARY GRADE.

1. Give a sketch of a bed of 10 retorts, and explain the manner of working same. 2. What do you understand by an "hydraulic main"

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 370.

Issue.	Share.	When ex. Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.	GAS COMPANIES.			£ s. d.
590,000	10	Apl. 14	10½	Alliance & Dublin 10 p.c.	19½—20½	..	5 2 5
100,000	10	,,	7½	Do. 7 p.c.	13—14	..	5 7 2
200,000	5	Nov. 12	6½	Bombay, Ltd.	6—6¼	..	5 4 0
140,000	5	,,	6½	Do. New, £4 paid	4⅜—5¼	..	4 18 11
380,000	Stk.	Feb. 25	12	Brentford Consolidated	240—245	+3	4 18 0
300,020	,,	,,	9	Do. New	180—185	+2	4 17 3
50,000	,,	,,	5	Do. 5 p.c. Pref.	127—132	..	3 15 9
206,250	,,	Dec. 11	4	Do. 4 p.c. Deb.	103—108	..	3 14 1
220,000	Stk.	Mar. 10	10⅝	Brighton & Hove Orig.	212—217	+7	4 19 1
246,320	,,	,,	7⅛	Do. A. Ord. Stk.	150—155	+5	5 0 0
460,000	20	Apl. 14	10	British	38½—39½	+½	5 1 3
100,000	Stk.	Feb. 25	6	Bromley, Ord. 5 p.c.	112—117	..	5 2 7
165,700	,,	,,	4½	Do. do. 3½ p.c.	85—90	..	5 0 0
500,000	10	Oct. 15	7	Buenos Ayres (New) Ltd	11¼—11⅝	..	5 19 2
250,000	Stk.	Dec. 30	4	Do. 4 p.c. Deb.	93—95	+2	4 4 3
150,000	20	Mar. 10	8¼	Cagliari, Ltd.	21—23	..	7 3 6
100,000	10	June 11	10	Cape Town & Dis., Ltd.	14—15	..	6 13 4
50,000	50	May 3	6	Do. 6 p.c. 1st Mort.	51—53*	..	5 13 2
1,375,000	Stk.	Feb. 25	5⅝	Commercial 4 p.c. Stk.	105—110	+1	4 14 6
536,485	,,	,,	5	Do. 3½ p.c. do.	103—106	+1	4 14 4
442,947	,,	Dec. 11	3	Do. 3 p.c. Deb. do.	86—88	+1	3 8 2
800,000	Stk.	Dec. 30	7	Continental Union, Ltd.	115—120	+2	5 16 8
200,000	,,	,,	7	Do. 7 p.c. Pref.	140—145	+2	4 16 7
575,000	Stk.	Feb. 25	5½	Crystal Palace Ord. 5 p.c.	118—123	+3	4 6 8
60,000	,,	,,	5	Do. 5 p.c. Pref.	120—125	+5	4 0 0
112,533	,,	Jan. 14	5	Do. 5 p.c. Deb. Stk.	135—138	+1	3 12 6
486,090	10	Jan. 28	10½	European, Ltd.	18½—19½	..	5 7 8
354,060	10	,,	10½	Do. £7 10s. paid	13½—14½	..	5 8 8
15,243,200	Stk.	Feb. 11	4⅛	Gas-light and Coke ⟨ 4 p.c. Ord.	95—97	..	4 10 9
2,600,000	,,	,,	3⅜	⟨ 3½ p.c. max.	88—90	..	3 17 9
3,799,735	,,	,,	4	⟨ 4 p.c. Con. Pref.	106—109	+1	3 13 5
4,193,975	,,	Dec. 11	3	⟨ 3 p.c. Con. Deb.	87—89	..	3 7 5
258,740	Stk.	Mar. 10	5	Hastings & St. L. 3½ p.c.	90—95	..	5 5 3
70,000	10	Apl. 28	11	Hongkong & China, Ltd.	15—16*	..	6 17 6
3,800,000	Stk.	Nov. 12	10	Imperial Continental	205—210	+2	4 15 3
473,600	Stk.	Feb. 11	3½	Do. 3½ p.c. Deb. Red.	98—100	..	3 10 0
165,242	Stk.	Mar. 10	6	Lea Bridge Ord. 5 p.c.	113—118	+1	5 1 8
561,000	Stk.	Feb. 25	10	Liverpool United A	210—211	..	4 14 9
718,100	,,	,,	7	Do. do. B	158½—160½	..	4 7 3
306,083	,,	Dec. 30	4	Do. do. Deb. Stk.	108—110	..	3 12 9
75,000	5	Dec. 11	5	Malta & Medn., Ltd.	4¼—4⅝	..	5 5 3
560,000	100	Apl. 5	5	Met. of ⟨ 5 p.c. Deb.	100—103	..	4 17 1
250,000	100	,,	4½	Melbourne ⟩ 4½ p.c. Deb.	109—102	..	4 8 3
541,920	20	Nov. 12	3½	Monte Video, Ltd.	9½—10½	..	6 13 4
1,515,892	Stk.	Feb. 26	4½	Newc'tle & G'tesh'd Con.	103—104	..	4 6 7
405,025	Stk.	Dec. 31	3½	Do. 3½ p.c. Deb.	93⅜—94½	..	3 14 1
300,000	Stk.	Nov. 26	8	Oriental, Ltd.	137—142	+2	5 12 8
600,000	5	Mar. 29	7	Ottoman, Ltd.	5½—6½	+¼	5 12 0
				* Ex div.			

Issue.	Share.	When ex. Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.	GAS COMPANIES.			£ s. d.
205,005	Stk.	Jan. 14	6½	Ply'mth & St'house 5 p.c	121—126	..	4 17 2
851,070	10	Apl. 28	7	River Plate Ord.	11¼—11⅜	−⅛	5 19 2
300,000	Stk.	Dec. 30	4	Do. 4 p.c. Deb.	93—95	+1	4 4 3
250,000	10	Mar. 29	7	San Paulo, Ltd.	11—12	..	5 16 8
135,000	Stk.	Mar. 10	10	Sheffield A	236—238	..	4 4 0
209,984	,,	,,	10	Do. B	235—237	..	4 4 5
523,498	,,	,,	10	Do. C	234—236	..	4 4 9
116,106	Stk.	Mar. 29	5	Shrewsbury Ord. 5 p.c.	107—110	..	4 10 11
6,150,000	Stk.	Feb. 11	5½	South Met., 4 p.c. Ord.	124—127	..	4 3 11
1,832,700	,,	Jan. 14	3	Do. 3 p.c. Deb.	86—89	..	3 7 5
380,940	Stk.	Nov. 12	5	Southampton Ord.	105—110	..	4 10 11
87,950	,,	Jan. 14	4	Do. 4 p.c. Deb.	100—103	..	3 17 8
120,000	Stk.	Feb. 25	6	Tottenham and Edmonton ⟨ A. 5 p.c.	120—125	+2	4 16 0
313,020	,,	,,	4½	⟨ B. 3½ p.c.	97—102	+2	4 8 3
182,380	10	Dec. 30	8	Tuscan, Ltd.	8½—9	..	8 17 10
149,000	10	Jan. 2	5	Do. 5 p.c. Deb. Red.	97—99	..	5 1 0
745,872	Stk.	Mar. 10	5	West Ham, 5 p.c. Ord.	97—102	+2	4 18 0
				WATER COMPANIES.			
781,517	Stk.	Dec. 30	12	Chelsea, Ord.	352—357	..	3 7 3
150,000	,,	,,	5	Do. 5 p.c. Pref.	142—147	..	3 8 0
160,000	,,	,,	4½	Do. 4½ p.c. Pref. '75	132—137	..	3 5 8
175,785	,,	Mar. 29	4½	Do. 4½ p.c. Deb.	130—135	..	3 6 8
1,720,560	Stk.	Mar. 29	8	East London, Ord.	218—223	..	3 11 9
654,740	,,	Dec. 11	4½	Do. 4½ p.c. Deb.	130—135	..	3 6 8
1,524,288	,,	,,	3	Do. 3 p.c. Deb.	88—91	+1	3 5 11
700,000	50	,,	10	Grand Junction ⟨ 10 p.c. max.	136—139	..	3 11 11
310,000	Stk.	Mar. 29	4	⟨ 4 p.c. Deb.	115—120	..	3 6 8
708,000	Stk.	Feb. 25	10	Kent	315—320	..	3 2 6
160,000	,,	,,	7	Do. New, 7 p.c. max.	217—222	..	3 3 0
1,043,800	100	Dec. 30	11	Lambeth, 10 p.c. max.	314—319	..	3 9 0
406,200	100	,,	8½	Do. 7½ p.c. max.	225—233	..	3 13 0
550,000	Stk.	Mar. 29	4	Do. 4 p.c. Deb.	115—120	..	3 6 8
500,000	100	Feb. 25	10	New River, New Shares	360—370	..	2 14 0
1,000,000	Stk.	Jan. 28	4	Do. 4 p.c. Deb.	118—121	+1	3 6 2
902,300	Stk.	Dec. 30	7½	South-wark and Vauxhall ⟨ Ord.	275—280	..	2 13 7
126,500	100	,,	7½	⟨ 7½ p.c. max.	215—225	..	3 6 8
489,200	Stk.	,,	5	⟨ 5 p.c. Pref.	144—149	..	3 7 1
1,019,585	,,	Mar. 29	4	⟨ 4 p.c. A Deb.	115—120	..	3 6 8
1,155,066	Stk.	Dec. 11	10	West Middlesex	295—300	..	3 6 8
200,000	,,	,,	4½	Do. 4½ p.c. Deb.	130—135	..	3 6 8
200,000	,,	Mar. 10	3	Do. 3 p.c. Deb.	88—91	+½	3 5 11
				* Ex div.			

as compared with a "dry main"? State the functions of both. 3. Give a sketch of a horizontal condenser. What is it used for, and how is it regulated? 4. What is the meaning of the terms "scrubbing" and "washing" of gas, and how is such carried out? 5. How would you test the gas for illuminating power? 6. Describe the method of estimating the total quantity of ammonia in gas liquor. 7. How would you burn gas in order to get the highest illumination from its use? and of what do the products of combustion consist? 8. Explain, with the aid of sketches, the construction of, and method of working, a set of purifiers.

Only six questions were to be attempted in each paper; and the time allowed was three hours. The following were the results of the examinations: Honours Grade—First prize, R. H. Chree; second prize, W. R. Twigg; third prize, W. J. Herman. Ordinary Grade—First prize, H. R. Turner; second prize, S. P. Perry; third prize, W. A. Vanner. The winner of the first prize in the former grade is in the service of the Brentford Gas Company; Mr. Turner being with the Tottenham and Edmonton Gas Company. The first prizes are a silver and a bronze medal; the second and third being of 10s. and 5s. value respectively—all with the Poytechnic certificate.

LOCAL AUTHORITIES AND THE POSITION OF MAINS.

An Important Proposal.

Some time ago, the Westminster City Council authorized the Works Committee to spend £2000 in providing and fixing 200 sunk orderly bins. Of this number only 162 have been completed, and £1940 has been expended thereon. In a report recently made by the Committee, it is explained that the additional outlay was required in consequence of the necessity in several instances for diverting mains, pipes, &c., of statutory companies, and others, to permit the placing of the bins in proper positions. They point out to the Council that they have been put to this large additional expense owing to the powers possessed by the various statutory companies to lay their pipes and wires practically in any position they choose in the streets; and they say the Council have also had trouble for the same reason in connection with other public works, such as the fixing of lamp-posts. Though this subject has been discussed by the Council on several occasions, the Committee are of opinion that they should not cease their efforts to obtain increased powers of control over the companies. They have, therefore, instructed the Town Clerk to give an opinion as to whether it is possible, should any statutory company having the use of the streets and the subsoil of the streets without payment promote a Bill for further powers, to obtain the insertion of a clause to the effect that should any alteration of the pipes, mains, or boxes be at any time necessary, in consequence of any works required to be executed by the Council, the cost of such alteration should be borne by the company. The Committee also draw the Council's attention to the necessity of obtaining powers from Parliament to enable them to compel all statutory companies and others who make use of the streets and the subsoil of the streets without payment, including the owners of property the vaults of which are situated under the public way, to "move or alter their pipes, mains, boxes, vaults, &c., without charge to the Council, should such removal or alteration be necessary in consequence of any works required to be executed by the Council."

DUKINFIELD CORPORATION GAS SUPPLY.

A Record Year's Work.

At the Meeting of the Dukinfield Town Council on Monday last week, the presentation of the minutes of the Gas Committee afforded an opportunity for a review of the past year's working of the gas undertaking, some particulars in regard to which, taken from the report of the Engineer and Secretary (Mr. Harrison Veevers), have already been given in the "JOURNAL."

Mr. COOKE, in moving the adoption of the minutes, expressed his pleasure in stating that the past financial year had been the most successful one since the gas-works were acquired by the Corporation. It spoke well for the new retorts put in three years ago, and for the way in which they had been worked; and he thought it proved the Committee's wisdom in attempting to bring the works up to date. The yield of gas for the whole of last year was 11,476 cubic feet per ton of coal, which was fully 1100 cubic feet more than they ever obtained under the old system. The yield of coke was also about 4 cwt. per ton of coal more. He might add that since the retorts had been put in, they had done all that was expected of them; and he believed if the policy which had been carried out during the last three years were continued for another like period, they would have gas-works second to none in the neighbourhood, and they would be able to sell their gas much cheaper than it was now. They could make it as cheaply as their neighbours, only they were severely handicapped by capital charges, which last year amounted to nearly 10½d. per 1000 cubic feet. He thought the result, so far as manufacture was concerned, was, everything considered, very satisfactory. Coke, tar, and sulphate of ammonia had produced £590 more than the year before, and coal had cost £484 less, owing to the increased yield of gas per ton and slightly reduced price. In retorts, repairs of works, mains, services, and meters there had been a saving of £844 8s. 3d. On the other hand, rates and taxes had amounted to £146 more. After paying off the third instalment for the retort-stack, £928 12s. 9d., and £79 13s. 1d. for a portion of a new main, there was a profit upon the year's working of £1470 13s. 5d., which, all things considered, was very satisfactory. The Committee recognized that during the last three years the gas consumers had paid nearly £3000 towards remodelling the works, and bringing them up to

WALKER'S PATENT

SULPHATE OF AMMONIA PLANT

Recovers the WHOLE of the Ammonia.

SULPHUR RECOVERY PLANT

For Recovering the Sulphur from Waste Gases of Saturator.

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Midland Iron Works:
DONNINGTON, NEWPORT, SALOP.

London Office:
110, CANNON STREET, E.C.

date; and it was thought that they should now be considered a little. The Committee therefore recommended the Council to reduce the price of gas 2d. per 1000 cubic feet. After this was done, it would leave the Committee with a very satisfactory balance. If the Council sanctioned this reduction, the price of gas would be 2s. 4d. to 2s. 9d. per 1000 cubic feet, according to the quantity used. Another point he thought should not be overlooked by gas consumers in Dukinfield. The Committee did not charge anything for meter hire to small consumers. He did not think this was carried out generally in the district. He thought it was only fair to mention this, because it was equal to 3d. per 1000 cubic feet to ordinary householders, if they compared their prices with others in the neighbourhood. The prospects for the current year were all that could be desired; and he thought the gas consumers had a better future before them.

Alderman HADFIELD seconded the motion, and it was carried.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

The hearty send-off which the Scottish Junior Gas Association received at the meeting in Glasgow to-night bodes good for the new body. At the meeting in Edinburgh a fortnight before, the only business done was the appointment of an interim Secretary, with a view to the organization of the East of Scotland district. On account of the hurried manner in which that meeting was convened, it was impossible to do more. In the case of to-night, it was different. The gentlemen who attended—and it was a pleasure to see so many—had the benefit of the favourable opinions towards the formation of an Association which were expressed in Edinburgh, and of the organizing exertions of Mr. Alex. Wilson and Mr. J. Lowe, of Glasgow. It says much for their spirit of loyalty to the profession that they, who have secured positions for themselves, should be so willing to help others to climb the ladder. The thorough unselfishness of these two gentlemen in promoting the formation of the Junior Association is so striking, that it must impress itself upon all. Following their guidance, the party who assembled in the Technical College had their minds made up to go on with the movement. They did not hesitate, but rather jumped at the idea; for so unanimous was the meeting in favour of an Association being formed, that no seconder to the proposition was necessary. Mr. Lowe has been appointed President of the Western Branch of the Association. It cannot but be recognized that there is a very vivid foreshadowing of the good which such an Association may do for the gas industry in the universal promises of support which have been received from the leading gas managers in the country. Even were it found that those gentlemen were unable to come forward with papers for discussion—as to which there may be no necessity—the opening of works for inspection by members of the Association will prove to be one of the very best educative means at the command of the Council. The universality of spirit which is exhibited in the resolution to admit so various a class of students, is a sign of the desire of the promoters to nurture a policy of usefulness in all that is attempted. All that remains now is for the other branches to spring into existence, and be in readiness to start work next winter. Perhaps the word "branches" may be found to be erroneous, for it is probable that there will only be one other—that in the east. North of the Tay, students are so sparse that it would be next to impossible to carry on a branch of the Association, at least without financial help, for the provision of which there is as yet no prospect. For northern managers and engineering students, it may be permitted to point out that it might be worth their while to make some sacrifices to organize a branch for themselves, because of the disadvantages under which they will labour, in the obtaining of advancement, if the branches in the south should prove a success; and, if properly guided—as there is every prospect they will be—there need be no fear but that success will attend their labours for the advancement of the junior.

As mentioned in a paragraph in this week's "JOURNAL," the Edinburgh and Leith Gas Commissioners on Monday fixed their contracts for coal and other stores for the year from Whitsunday ensuing. Bailie Bryson, of Leith, who presided, said the Works Committee had agreed to recommend the purchase of 84,000 tons of cannel, and 117,000 tons of other coal—making in all 201,000 tons. The price was, over all, 7d. per ton less, on the average, than last year. The next item of stores was meters. They had agreed to recommend that the offers of Messrs. R. Laidlaw and Son, Limited, of Edinburgh, for 2, 3, 5, and 10 light meters; and of Messrs. James Milne and Son, Limited, of Edinburgh, for 20, 30, 50, 80, 200, and 300 light meters, be accepted—these being the lowest estimates.

The report by the Sub-Committee on Stores was furnished at the end of the meeting, from which it appeared that the average price for cannel was 17s. 7d per ton, and for other coal 8s. 9d. per ton. The cost of coal during the current year had been 13s. 1d. per ton used, and 15·31d. per 1000 cubic feet of gas, the selling price of which has been 2s. 9d. per 1000 cubic feet. The coal bought a year ago was 60,000 tons of high-class cannel, 120,000 tons of splint and common coal, and 6000 tons of coking coal; and the price was 9d. per ton less than in the previous year. A year ago 2000 tons of gas oil were purchased. This year, it will be observed, there is no oil; but the proportion of cannel is increased.

The "Glasgow Herald" of Wednesday contained a statement in its commercial column, dated Tuesday, in which the following occurs: "The Edinburgh and Leith Gas Corporations accepted tenders yesterday for their requirements of coal for the ensuing season, purchasing in all about 200,000 tons, of which about 85,000 tons were first-class cannel coals, the balance being principally made up of splints. . . . The prices paid for splints are about 6d. per ton less than last year. First-class cannels commanded last year's prices, with the exception of one parcel, which was bought at a reduction of 1s. per ton."

CASUAL LABOUR.

WRITE FOR PARTICULARS OF

LITTLE'S Patent CONVEYORS

TO

NEW CONVEYOR CO., LTD., SMETHWICK.

At the Edinburgh Town Council on Tuesday, a letter from the Clerk to the Edinburgh and Leith Gas Commissioners was submitted, intimating that they were agreeable to supply gas for public lighting for the year from Whitsunday next at the price of 2s. 5d. per 1000 cubic feet net for ordinary burners, and at 2s. per 1000 cubic feet for use in incandescent burners. Treasurer Brown said he hoped the Cleaning and Lighting Committee would look into this matter, because, in his view, either the private consumer was getting too good a bargain—was getting gas too cheaply—or the city were paying too much for gas for public lighting. It was agreed that the point should be inquired into. Mr. Macpherson and Treasurer Brown gave notice of motion in the following terms: "That, inasmuch as any citizen who consumes gas to the value of £800 per annum, at 2s. 8d. per 1000 cubic feet, and receives 10 per cent. discount on the amount of his account, is thereby getting relatively better terms from the Gas Commissioners than the latter are giving to the city for public lighting purposes at 2s. 5d. per 1000 cubic feet net on an account of about £20,000 per annum, it be remitted to the Cleaning and Lighting Committee to ascertain from other towns in England and Scotland the terms on which gas is supplied to them for public lighting by gas corporations or gas companies in these cities and towns, and report." The price of gas is 2s. 9d. per 1000 cubic feet, not 2s. 8d. as stated here.

A strange situation has arisen in connection with the Dundee Corporation Gas-Works. It transpired at a meeting of the Town Council on Thursday that the titles to the properties which were taken over from the Gas Companies in 1868 have been lost sight of. The late Sir Thomas Thornton acted as Law Agent for the Corporation in the transfer; and, as is usual, he being also Town Clerk, the titles were left in his hands. Now that he is gone they cannot be found. It was intimated that the present Town Clerk had written to the firm of the late Town Clerk on the subject, and had received a reply to the effect that the titles were not in their possession. The Town Clerk said he had searched the city archives, but could find no trace of them. Mr. Brownlee, who is easily excited at times, thought that this was a most extraordinary state of affairs. There is nothing extraordinary about it. It is a practice of Law Agents to keep hold of titles to property as long as they can, because, for one thing, it helps to keep the agency in their hands. The search is being continued, and the titles are likely to be found. Even if they are not, the system of registration of titles is, in Scotland, so complete, that there will be no difficulty in getting a new set—only they will have to be paid for, which is all the inconvenience that the Corporation will be put to in the matter. There is no fear of their being evicted from the works; so that Mr. Brownlee and others may take their rest at night without fear of any serious consequences arising out of the incident.

The Directors of the Laurencekirk Gas Company have resolved to make a laudable endeavour to increase the consumption of gas, with a view to leading to further advantages to themselves and their consumers. The price is 6s. 8d. per 1000 cubic feet; but during the summer months—between the May and November readings of the meters—they are to reduce it to 5s. They are also to supply, at wholesale cash prices, appliances for cooking and heating by gas, with the services of the Gas Manager to fit them up. The summer consumption has increased by 60 per cent. in seven years, which is very creditable to the management of the Company. The experiment should be of interest to many, because, if the enterprise is a success in Laurencekirk, there is no reason why it should not be in other small towns.

At the Motherwell Town Council on Tuesday, Mr. Marshall moved that a Committee be appointed to consider the question of acquiring the undertaking of the Gas Company. He considered that the Council would be failing in their duty if they did not do that. It seemed to him to be strange that towns like Airdrie, Hamilton, and Wishaw should possess their own gas-works, and that in Motherwell they should be indebted to a Company for their gas. Although, in his opinion, electricity provided the more popular light, there was no reason why the Corporation should not take over the gas-works. His motion was simply to appoint a Committee in the meantime to consider and fully report on the whole question. The Council approved; and the subject was sent to the Lighting Committee to consider.

During this week, a Committee have been holding inquiries in Glasgow into a group of applications for parliamentary powers, under the Private Legislation (Scotland) Act. Among these was one by the Caledonian Railway Company, who seek powers for, among other purposes, the formation of a railway siding into the Hamilton Corporation Gas-Works. To this part of the application opposition was offered on behalf of residents in Hamilton, who lodged a petition craving the Secretary for Scotland to intervene to prevent the construction of level crossings, which the petitioners considered would be dangerous to the community. It was objected to this that the opposition was not lodged in time. The Committee upheld the objection; and the application passed without opposition. In this matter it may be said of the opposition that there has been great cry and little wool.

Two days before this took place, an inquiry was held by Sheriff Davidson in Hamilton, into an application by the Corporation of Hamilton to the Secretary for Scotland for power to include the general assessment of the burgh in any security granted by the Town Council in respect of money borrowed by them under the Hamilton Gas Order of 1901, and to empower them, in the event of sanction being granted, to set apart out of the assessment, such proportion as the Council might think reasonable of the sums which they are, by the Order, required to set apart as a sinking fund, or for making good any deficiency in the income of the fund. Provost Keith stated, in the course of evidence, that the gas-works, acquired by the Corporation in 1869, formed part of the common good of the burgh; the Council being directed to hold them for the behoof and benefit of the burgh, as extended by the Hamilton Burgh Act of 1878. The Order of 1901 gave the Corporation power to borrow £80,000, and to give the gas rates and rents and the revenue of the common good in security. Though these rents and revenues were ample, and could be greatly increased, they had been legally advised that they were not such securities as would

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WINDSOR ST. WORKS, BIRMINGHAM	2,000,000	KINGSTON, PA.	125,000	STRETFORD	500,000
SALTLEY WORKS, BIRMINGHAM	2,000,000	PETERBOROUGH, ONT.	250,000	OLDBURY	300,000
COLCHESTER	300,000	WILKESBARRE, PA.	750,000	TODMORDEN	500,000
BIRKENHEAD	2,250,000	ST. CATHERINES (2nd Cont)	250,000	SALTLEY, BIRMINGHAM (Third Contract)	2,000,000
SWINDON (New Swindon Gas Co.)	120,000	BUFFALO, N.Y.	2,000,000	YORK (Second Contract)	750,000
SALTLEY, BIRMINGHAM (Second Contract)	2,000,000	WINNIPEG, MAN.	500,000	ROCHESTER (Second Contract)	500,000
WINDSOR ST., BIRMINGHAM (Second Contract)	2,000,000	COLCHESTER (Second Contract)	300,000	NEWPORT (MON.)	250,000
HALIFAX	1,000,000	YORK	750,000	TOKIO, JAPAN	1,000,000
TORONTO	250,000	ROCHESTER	500,000	PERNAMBUCO (Brazil)	125,000
OTTAWA	250,000	KINGSTON, ONT.	300,000	MALTON	150,000
LINDSAY (Remodelled)	125,000	CRYSTAL PALACE DISTRICT	2,000,000	DULUTH, MINN. (2nd Cont.)	300,000
MONTREAL	500,000	DULUTH, MINN.	300,000	BROCKVILLE (ONT.)	250,000
TORONTO (Second Contract Remodelled)	2,000,000	CATERHAM	150,000	SMETHWICK	500,000
BELLEVILLE	250,000	LEICESTER	2,000,000	GRAVESEND	300,000
OTTAWA (Second Contract)	250,000	ENSCHEDE (HOLLAND)	150,000	NEWPORT MON. (Second Contract)	250,000
BRANTFORD (Remodelled)	200,000	BUENOS AYRES (RIVER PLATE CO.)	700,000	TORONTO (Third Contract)	750,000
		BURNLEY	1,500,000	TORONTO (Fourth Contract)	1,000,000
		KINGSTON-ON-THAMES	1,750,000	MONTREAL, ONT. (2nd Cont.)	1,800,000
		ACCRINGTON	500,000	HAMILTON, ONT.	400,000

Complete Gas-Works at NELSON, BRITISH COLUMBIA.

LEEDS, 1,800,000 C. Ft. LEICESTER (2nd Cont.), 1,000,000 C. Ft. NEWCASTLE-ON-TYNE, 1,800,000 C. Ft.
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entitle trustees to invest in them. The price of gas is the lowest in Scotland; and the revenue of the common good is upwards of £1200 per annum. Apart from the capital requirements of the gas-works, the gas rents and revenue are security for money borrowed for the purposes of electric lighting. They had no authorized rate in security for the principal or interest of money borrowed on mortgage; and thus the real security was the value of the gas undertaking as a trading concern. Hence the difficulty of borrowing from trust funds. At present the Corporation have no power to levy an assessment for gas-works purposes, as the Burghs Gas Supply Acts have not been adopted by the burgh, and no provision has been made in the Local Acts for such an assessment. The Provost submitted, as the result of inquiries, that in other towns the powers sought for were possessed; and he quoted figures to show that at present the security was commercially good, but that the Corporation desired to be able to give a security which could be accepted by the legal advisers of trust estates, and also to be able to utilize trust funds which might be in the market for investment. The Caledonian Railway Company sought that a provision should be given that the gas-rates should not be used until the Council had applied the gas rates and rents, as well as the revenue of the common good, in the repayment of borrowed money. The Corporation agreed to this provision; and the Sheriff said the position appeared to him to be thoroughly satisfactory. The Sheriff will report his opinion to the Secretary for Scotland.

A difference of opinion has arisen between the Town Council of Carnoustie and the Carnoustie Gaslight Company over the public lighting of the place. The Company's account for gas consumed during the past year amounted to £212. This startled the Corporation, who remembered that the account for the previous year was only £124. But it turns out that, as usual, there were great complaints during the winter regarding the lighting of the streets, which was denounced as poor, and that the Lighting Committee of the Corporation ordered it to be improved. The contract was for a supply of gas to be consumed in 3-feet burners, but 5-feet burners were substituted for these, with a result which surprised the Corporation, though it need not. The Town Council on Monday appointed a deputation to wait upon the Directors of the Gas Company on the subject. This they did on Wednesday. It is reported that there was a hot discussion, in which it was pointed out, on the one side, that notice of the increase in the consumption was not given, and, on the other, that verbal notice was given to the Lighting Inspector. The Corporation representatives pressed for a reduction in the amount of the charge. This was agreed to—a considerable sum being taken off. The deputation expressed their pleasure at the courtesy and fairness with which they had been received.

The money advanced on loan to local authorities up to March 31, 1903, amounted to £167,989,216. The principal sums outstanding on that date in respect of these loans reached a total of £64,014,485.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *May 7.*

Sulphate of Ammonia.

There has been no improvement in demand, while there has been more anxiety on the part of makers to market their output and more second-hand selling. Consequently prices have declined all round, and the closing quotations are £12 to £12 2s. 6d. per ton f.o.b. at the ports. In the forward position the London quotation is £12 2s. 6d. per ton, Beckton terms; and there are sellers at the equivalent f.o.b. other ports. Buyers, however, for the most part, remain indifferent, notwithstanding speculative offering abroad at a substantial discount on these figures. In view of the satisfactory exports for April, it is somewhat remarkable that the market should have declined.

Nitrate of Soda.

This article, unlike sulphate of ammonia, continues in good demand, in spite of its relative dearness, and local prices are maintained at 10s. 3d. and 10s. 6d. per cwt., for ordinary and refined qualities, respectively.

LONDON, *May 6.*

Tar Products.

Markets generally are quiet; and there has been rather an absence of demand. There is a decidedly easier tone in the market generally for pitch, as the demand from South Wales appears to have ceased. It is reported that consumers have covered their requirements at about their own limits, and that business has been done in more than one instance up to the end of the year at very reasonable figures, and considerably under those being quoted for prompt delivery. As regards the Continent, there is not at present any demand from either Belgium or the North of France; but dealers are understood to be offering for September-December in Belgium at very low prices. Consumers, however, hold off the market just at present—in fact, many of them are reported to be fully supplied up to the end of the present year. There are several speculative inquiries in the market for January-June, 1905; but it is extremely difficult to fix the actual value over this period. A further quantity of 90 per cent. benzol was sold at 9d. per gallon f.o.b. Goole; while business is reported in 50-90 per cent. at 7d., delivered to consumers' works in the North of England. There is no business doing in either toluol or solvent just at present, and prices are purely nominal; consumers appearing utterly indifferent to same for either prompt or forward delivery. The demand for creosote in the North continues very good; but as regards London, the market is decidedly easier. One or two transactions are reported at prices considerably under those recently quoted; and there does not appear much likelihood of improvement for some time to come. One or two small parcels of fairly good quality anthracene have been placed for early delivery; but manufacturers decline to offer for next year, except at a great

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advance on existing prices. The demand for carbolic acid is very good; and prices are well maintained. A large business has been done at 2s. per gallon for May-June shipment; and consumers are now willing to pay this price for July-September. Makers, however, ask a slight advance on same, which consumers do not appear at all inclined to pay. In crystals, there is not much inquiry, and German producers appear anxious to sell for July-December delivery; but consumers will not at present make offers so far forward.

The average values during the week were: Tar, 17s. 6d. to 22s. 6d. Pitch, London, 32s. 6d. to 32s. 9d.; east coast, 32s. to 32s. 3d.; west coast, 31s. to 31s. 3d. Benzol, 90 per cent., 9d.; 50-90 per cent., 7d. Toluol, 6½d. Crude naphtha, 3d.; solvent naphtha, 6½d. to 8d.; heavy naphtha, 10d. to 10½d. Creosote, London, 1⅛d.; North, 1¼d. Heavy oils, 2¼d. Carbolic acid, 60 per cent., 2s. Refined naphthalene, £5 to £8; salts, 22s. to 24s. Anthracene, "A" quality, 1⅜d. to 2d.; "B" quality, 1d., nominal.

Sulphate of Ammonia.

Markets close with a very quiet tone; and there does not appear to be much inquiry for either prompt or forward delivery. Beckton quote £12 2s. 6d. for prompt; but have accepted £12 1s. 3d. June-October inclusive. The South Metropolitan are still asking £12 5s. on their special terms; but consumers will not entertain business at this price. Sales are reported in Hull at £12 3s. 9d. and £12 5s. for immediate shipment; but for forward, consumers decline to offer just at present. The Liverpool market is very quiet. There are sellers at £12 1s. 3d. for prompt delivery; but there seems to be a total absence of business just at the moment. In Leith, there are sellers at £12 2s. 6d. for immediate shipment; but there is no business of importance to report, either for prompt or forward delivery.

Edinburgh and Leith Coal and Meter Contracts.—With reference to the statement made in the concluding lines of the paragraph on this subject in the last number of the "JOURNAL," we are informed by Messrs. Bruce Peebles and Co., that the contract for the supply of all the prepayment meters was given to them.

Incandescent Gas Lighting for Churches.—A complete installation of incandescent gas lighting is to be put into Holy Trinity Church, Beckenham. It is interesting to note that this system has been chosen in face of the fact that the Local Authority offer special terms for the electric lighting of churches and public institutions.

Steam-Rollers and Gas-Mains.—The St. Pancras Borough Council on Wednesday considered a claim from the Gaslight and Coke Company for damage done to a main in St. Mark's Square by the Council's steam road-roller. The Engineer and Surveyor (Mr. W. N. Blair) stated that there was no evidence that the injury was done by the roller; also that the main was laid at insufficient depth. It varied from 1 ft. 3 in. to 1 ft. 4½ in. below the surface of the road. It was resolved to dispute liability.

COAL TRADE REPORTS.

Lancashire Coal Trade.

Practically the whole of the Lancashire tenders for supplies of locomotive fuel for the London and North-Western Railway Company have now been sent in; but so far there is nothing further of any great weight being done in connection with the gas-coal contracts. For the locomotive fuel contracts, the whole of the Lancashire tenders are based on 7s. 6d. per ton at the pit, which is 3d. below the contract price of last year. With regard to gas coals, so far as contracts have been concluded the reductions on last year range from 3d. to 6d. per ton; but it would seem to be only in exceptional cases where collieries have given way to the full extent of 6d. So far as prices can be gathered, the commoner sorts of gas coal would seem to be obtainable from about 7s. 9d. to 8s. per ton at the pit, with better qualities at 8s. 6d. to 9s, and good screened Arley coals about 9s. 9d. to 10s. These, however, so far can be only given as approximate prices, as the large bulk of the contracts have yet to be dealt with. For ordinary descriptions of steam and forge coals, 7s. 9d. to 8s. per ton would be readily taken in many cases, with from 8s. 3d. to 8s. 6d. about average quoted rates. For house-fire coals, the demand is steadily falling off, and a great many pits are not putting in more than three to four days. Here and there further reductions have been made in prices in districts where they were not reduced last month; but there has been no general official reduction outside the Manchester area. The market, however, taking it all through, is weak and irregular; and prices are steadily easing down to something like a general basis representing a giving way of 6d. to 10d. per ton upon the winter rates. Quotations average about 13s. to 14s. per ton for best Wigan Arley, 11s. to 12s. for seconds Arley and Pemberton four-feet, and 9s. to 10s. for common house-fire coals. Engine classes of fuel continue plentiful on the market; but for the better qualities of slack prices are as a rule being steadily held to on the basis of 6s. to 6s. 6d. at the pit, with good medium sorts quoted about 5s. to 5s. 6d. The inferior sorts of slack, however, have to meet very keen competition from other districts, particularly Derbyshire and Staffordshire, and all sorts of prices are ruling on the market for clearance sales. Derbyshire slacks are obtainable from as low as 1s. 6d. to 2s. per ton at the pit, with common Lancashire slacks to be bought as low as 3s. 9d. and 4s. to 4s. 3d. In the shipping trade, only a moderate business is passing through, with good ordinary qualities of steam coal not averaging more than 9s. to 9s. 3d. per ton delivered at Mersey ports or the Manchester Ship Canal.

Northern Coal Trade.

There is a better demand for steam coal for export; but for some other classes of fuel the demand is less than it was. Best Northumbrian steams are steady at from 10s. 6d. to 10s. 9d. per ton f.o.b.; and the production seems now to be well taken up, with nearly full work at the chief collieries. Second-class descriptions are not quite so well circumstanced for orders; and the price is about 9s. per ton f.o.b., steam smalls being from 4s. 9d. to 10s. 3d. In the gas coal trade,

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there are now reduced quantities being taken by the large consuming companies; but there is some increase of the exports. Prices for Durham gas coals vary from about 7s. 9d. up to 8s. 3d. or 8s. 4½d. per ton f.o.b., according to quality. No large contracts have been reported of late; but one or two of the local towns have settled for supplies of moderate amounts at reductions of about 6d. per ton on preceding contracts. The lessened production of gas coke has made its price firmer; but the figures are substantially the same as those of last week.

Scotch Coal Trade.

Orders are for the moment not so plentiful; and the slackening in the demand has put a slight check upon prices. The volume of trade, however, remains good. Large contracts are coming in, and coal-owners, who have secured a reduction of miners' wages to the minimum standard, are obliged to accept lower prices, in order to prevent agitation among the miners. The prices quoted are: Main 7s. 6d. to 7s. 9d. per ton f.o.b. Glasgow, ell 8s. 3d. to 9s. 6d., and splint 8s. 6d. to 8s. 9d. The shipments for the week amounted to 264,953 tons—an increase of 21,751 tons upon the previous week, and of 56,500 tons upon the corresponding week of last year. For the year to date, the total shipments have been 3,384,418 tons—an increase of 105,520 tons upon the same period of 1903.

The Proposed Sale of the Tunbridge Wells Electricity Works.—It is reported that the Lighting Committee of the Tunbridge Wells Town Council have decided to recommend the Corporation to decline the offer which was recently made to purchase their electric light works for £80,000, which would have allowed a profit of £10,000 on the capital expended. The Committee are of opinion that it is to the interest of the Corporation to keep the undertaking in their own hands; and they also express the opinion that it can be made to pay.

The Period for Water-Works Loans.—The Otley District Council are in trouble with regard to their water-works loan. The original estimate for the scheme carried out by them was £55,000; and Parliament granted permission for this sum to be borrowed for a period of 60 years. The estimate has, however, been exceeded by no less than £40,000; and after a Local Government Board inquiry for sanction to borrow this extra sum, permission was granted, but only for a period of 35 years. This will make a difference of a 3d. rate to Otley; and the Council therefore requested their Member of Parliament (Mr. J. Hastings Duncan) to ask the Local Government Board to consent to an interview with a Committee of the Council, who would explain the circumstances of the matter. The Board have replied that they had all the considerations in mind when they fixed 35 years; and they are of opinion that Parliament did wrong in allowing 60 years for the repayment of these loans. It is stated that the Council do not intend to let the matter rest where it is.

Incandescent Gas Lighting in Nottingham.—During last winter, the Nottingham Corporation Lighting Committee continued to extend incandescent lighting, and replaced the ordinary burners with incandescent lamps in a great number of streets; the total number of incandescent lights being 1573 on 1181 lamps. The result has been very satisfactory, and has proved to be a great improvement over the old flat-flame burners at a decreased cost for gas supply. The Committee, therefore, propose to extend the incandescent lighting throughout the city as rapidly as possible.

Gas-Works Results at Heywood.—At a recent meeting of the Heywood Corporation Gas Committee, the Manager (Mr. W. Whatmough) reported that the gross profit for the past year amounted to £6839, and the net profit to £1716. If it had not been for the increase of rates, which meant an added expenditure of £254, and £86 for repairing meters free of charge to the owners, the net profit would have been £2057. The Committee decided to recommend that £1200 be used for the relief of the rates, and the balance put to the reserve fund. Twelve months ago the amount handed over was £750.

Incandescent Gas Lighting at West Ham.—At the meeting of the West Ham Corporation last Tuesday, the Borough Engineer reported that, after a long correspondence with the Engineer of the Commercial Gas Company (Mr. Stanley H. Jones) with respect to the lighting of the streets by incandescent gas, a satisfactory arrangement had been come to. The Company undertook to put up new lanterns fitted with No. 3 Kern burners under a five years' agreement, similar to that entered into with the West Ham Gas Company and the Gaslight and Coke Company; the repayment of the cost of such lanterns being made to the Company during the period of the agreement, and the Council paying at the rate of £2 9s. per annum for the supply of gas and maintenance. It was resolved to enter into an agreement with the Company upon the foregoing lines.

Norwich Electric Street Lighting.—The Norwich Town Council have decided that, to enable the Electricity Committee to test the efficiency of electricity for street lighting, notice shall be given to the British Gaslight Company, in accordance with the terms of the contract entered into between them and the Company, of their intention to purchase 29 lamps situated in several of the streets. Mr. Wild said it was due to the city that, having acquired the electricity undertaking, the citizens should as far as possible make use of it, in order to keep the town abreast of other large places, even if they had to pay a little more than for gas, which he did not expect would be the case. In using the current, they were really "buying at their own shop." Mr. Scarles, however, remarked that anyone who knew anything about the subject was aware that electricity was not as cheap as gas. He was not against the experiment; but he did hope that it would be treated on business rather than on charitable lines. What they wanted was a reliable meter and a reliable audit, so that they might know the actual cost, and not be "bamboozled."

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GAS . . .
BOILER . .
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HEATER . .

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CANNON IRON FOUNDRIES, LD., DEEPFIELDS, NEAR BILSTON, STAFFS.

London Office and Show-Room: BATH HOUSE, 57/60, HOLBORN VIADUCT, E.C.

The Charge for Public Lighting in Rochdale.—The Rochdale Corporation having, as already reported, decided that in future the public lighting should be charged for, instead of being supplied free by the Gas Committee as heretofore, have hit upon a novel expedient for raising the necessary money. Owing to the existing situation, the Finance Committee did not feel justified in throwing this extra burden on the rates; and they have therefore decided to recommend the Council to take the amount required (about £5000) from the gas-works reserve fund. This fund now amounts to just over £20,000—a sum which was accumulated with the object of providing a new retort-house. It is understood that in the circumstances the Gas Committee will not object to the proposed tapping of their reserve, and that it is only on this occasion that money will be raised this way.

Sales of Stocks and Shares.—The popularity of Bristol Water stock among investors was again demonstrated last Thursday, when Messrs. Alexander, Daniel, and Co. offered for sale, in accordance with the announcement made in our advertisement columns, £15,000 of 7 per cent. maximum consolidated ordinary stock. There was a large attendance, and a spirited competition took place. The stock was put up in lots of £100, at the reserve price of £147; and the whole was disposed of at highly satisfactory prices. The highest figure touched was £151; and the lowest £148—the average working out at £148 17s. 2d. The total amount realized was £22,328 15s. On Thursday evening, Messrs. Standing and Gorbutt sold by auction, at Epworth, eight £5 shares, fully paid up, in the Epworth Gas Company, at par. On the same day, Mr. Thomas Farrall, of Sherborne, held a sale of shares and stock in the Sherborne Gas and Coke Company at the Antelope Hotel in that town. Five lots of £5 ordinary shares were first disposed of, and were bought at £7 15s. each. Five preference shares sold at £5 15s. each, and £250 4 per cent. debenture stock fetched £250.

Reductions in Price.—The Eckington and Mosbro' Gas Company announce that the price of gas to ordinary consumers will be reduced from 4s. to 3s. 8d. per 1000 cubic feet as from the commencement of the current quarter. The Birstall District Council have resolved that the price of gas consumed through prepayment meters shall be reduced; 25 cubic feet being allowed for a penny in future. The operations of the Sowerby Bridge gas undertaking during the past year have proved so profitable that the Committee consider themselves justified in recommending the District Council to reduce the charges made to consumers. They are said to have decided to alter the price in Sowerby Bridge from 2s. 4d. to 2s. 3d. per 1000 cubic feet, in Ripponden and district from 3s. 1d. to 3s., and in Luddenden Foot from 3s. 4d. to 3s. 2d. The New Mills Urban District Council have reduced the price of gas 3d. per 1000 cubic feet. As mentioned elsewhere, the Dukinfield Corporation have, on the recommendation of the Gas Committee, lowered the price from 2s. 11d. to from 2s. 9d. down to 2s. 4d. per 1000 cubic feet. The Swansea Gas Company have given notice of a reduction in the price of gas (commencing on July 1 next) from 3s. to 2s. 10d. per 1000 cubic feet to private and coin-meter consumers, and to 2s. 8d. for public purposes.

Gas-Works Purchase Question at Wigston.—The Wigston Urban District Council have passed a resolution empowering the Finance Committee to open negotiations for the purchase of the undertaking of the local Gas Company. Mr. Parker, in introducing the matter, said the paid up capital was £24,487, including shares to the extent of £19,987. The maximum dividend of 10 per cent. was being paid to the original shareholders, and 7 per cent. on the new shares. Basing his calculations on the figures in the report, he estimated that the total amount required for the purchase of the works should be about £36,000. Another member, however, said he was afraid the price asked would be more like £72,000.

Tarapaca Water-Works Company, Limited.—The 16th annual meeting of the Company was held on Monday last week at Winchester House, E.C. Sir Robert Harvey, who presided, reminded the shareholders that, when dealing with the accounts for 1902, he pointed out that they were for an abnormally prosperous period, and must not be taken as a criterion of future results. The profits for 1903 amounted to £45,198, which was equivalent to a little more than 11 per cent. on the capital. It was, however, a decrease of £7201 as compared with the previous twelve months' profits. The receipts from the sales of water had been less by about £1600. The expenses, on the other hand, had been greater, owing to legal expenses in connection with lawsuits. It was proposed to place £20,000 to the reserve fund, which would then stand at £80,000, a large proportion of it being in cash. The capital expenditure had been £458,000, though the capital was only £400,000. In conclusion, he moved the adoption of the report, the payment of a final dividend of 4 per cent. (making 7½ per cent. for the year), and the transfer of £20,000 to the reserve fund, leaving £18,000 to be carried forward. The motion was adopted.

New Joint-Stock Companies.—The following Companies have lately been registered: The Tavistock Lighting, Coal, and Coke Company, Limited, with a capital of £15,000, in £5 shares, to acquire, as from Dec. 31, 1903, the business of the Tavistock Gas, Coke, and Coal Company, Limited (incorporated 1857). The Gas Investment Company, Limited, with a capital of £25,000, in £1 shares, to acquire, hold, deal in stocks, shares, debentures, bonds, and securities of any company constituted or operating in the United Kingdom, British Columbia, or elsewhere, and to carry on the business of financiers, contractors, guarantors, &c. The Coking Company, Limited, with a capital of £50,000, in £20 shares, to acquire, on lease or otherwise, lands for the construction of works, to utilize slack or small coal, and to carry on the business of coke manufacturers, colliery proprietors, miners, manufacturers of, and dealers in, gas, coal, slack, coal tar, pitch, asphaltum, ammoniacal liquor, and other residual or bye-products obtained in the manufacture of coke; also to construct and maintain works for holding, receiving, and purifying gas, and any other works, machinery, and appliances required in the business. The Oil-Gas Stove Company, Limited, with a capital of £1500, in £1 shares, to acquire all or any of the rights and interests of J. J. Laferme, or others, in connection with inventions, patents, options, and the like, relating to oil-gas stoves.

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Design No. 2. With body in position.

REDUCED PRICES.

No. 1 DESIGN (Fixed Body),
£7 10s. Net.

No. 2 DESIGN (Detachable Body)
£8 Net.

EXTRA STRONG WHEELS
28 inches diameter.

Painted and Lettered
to Instructions.

MILES PLATTING, MANCHESTER. SAWER & PURVES, GT. FREEMAN ST., NOTTINGHAM.

Gas Profits at Carnarvon.—At last week's meeting of the Carnarvon Town Council, a gratifying report on the working of the Gas Department for the past year was presented by Alderman Parry, who said that the make of gas was more than 33½ million cubic feet—the largest on record; while the profits were also the highest during the last ten years, with the exception of 1901. The net profit was practically £600; and of this the Committee proposed to allocate £156 to the reduction of the general district rate.

A Profitable Year at Wigan.—In moving the confirmation of the minutes of the Gas Committee at the last meeting of the Wigan County Borough Council, the Mayor (Alderman C. B. Holmes) stated that, although there had been a reduction of 2d. per 1000 cubic feet in the price of gas during the past year, and owing to the cotton famine the mills had been stopped the greater part of the winter, and working in most cases from daylight to dark, still the profits of the gas undertaking amounted to the sum of £11,000. This had been handed over in aid of the district fund.

Further Capital for the Manchester Electricity Works.—The Manchester City Council have applied to the Local Government Board to borrow further money for the purposes of their electricity undertaking. For additional mains, they need £94,490; for the development of the motor hiring scheme, £10,000; and for lighting and traction works in several districts, £21,575. At the inquiry, Mr. Boardman, on behalf of the Property Owners' Association, informed the Inspector that the city's indebtedness already amounted to £21,000,000, that there was a heavy increase of rates in prospect, and that property owners felt strongly the present was an inopportune time for making additions to the capital expenditure of the Corporation. The Chairman of the Electricity Committee (Mr. Howarth) said that within the last two years the increase in the output, owing in a large measure to the heavy demand for traction purposes, had increased by 176 per cent., and last year was 29 million units. Since the establishment of the department in 1893, the sum of £173,419 had been set apart as a sinking fund, £50,683 had been paid into a reserve fund, and £52,963 handed over to the city. The total of these sums (£277,070) represented the aggregate profit. He added that no charge had ever been made against the rates by the department; and he had no fear that any charge would be made in the future.

Teignmouth Water Supply.—Negotiations are being carried on between the Teignmouth and Paignton District Councils which promise to end in removing the difficulty which has been experienced with reference to the water supply of Teignmouth. The Paignton Council are constructing new water-works, which will give the town a gravitation supply from Dartmoor. It is expected that these works will be completed in about 18 months, and as the quantity of water available will be considerably in excess of the requirements of Paignton, an offer has been made of a supply in perpetuity to Teignmouth. The charge proposed to be made is 5¾d. per 1000 gallons for the first five years, and then, or as soon as the main is duplicated, 5½d. per 1000 gallons. For the first period the average supply is to be a minimum of 150,000 gallons and a maximum of 250,000 gallons, and afterwards the minimum is to be 250,000 gallons and the maximum 600,000 gallons—the average to be a yearly one. Teignmouth is to lay a main a distance of 9¼ miles to the nearest point touched by the Paignton main. If the pipe is continued by Teignmouth to the reservoir, an additional 9¼ miles, a lower price will be charged for the water. The right of supplying places on the line of main is conceded to Teignmouth. At the end of forty years, the terms are to be subject to the arbitration of the Local Government Board. An agreement is being drawn up embodying these terms, which, so far, have met with approval.

At Swansea, last Thursday, an informal meeting was held between the various representatives of the vendor Companies comprising the scheme of the Anthracite Syndicate for South Wales, to discuss the question of launching a company. Out of 20 collieries interested in the proposed combine, 16 were personally represented, and the other four communicated by letter with the Syndicate on the subject.

An exhibition of the gas appliances of Messrs. R. & A. Main, Limited, was opened in Dundee on Monday last week by Mr. Stevenson, the Convener of the Corporation Gas Committee, under whose auspices the exhibition was held. Mr. Stevenson stated that during the past year 553 gas-cookers had been given out by the Gas Department; and Mr. A. P. Main said Dundee was the first place far-sighted enough to arrange for the hiring-out of these appliances. Miss E. M. Dodds, of Dundee, was the lecturer.

The new works erected at a cost of £42,000 by the Corporation of Exeter for the supply of electric light were opened on Tuesday last by the Mayor (Mr. J. Widgery). In the course of his speech on the occasion, he said they all rejoiced that the firm of their friend Mr. H. A. Willey had participated in the provision of the plant, because it showed that they had in their midst a firm who could take their place in the world's keen competition. He was very pleased with the new installation, although he did not wish to disparage any other undertaking which existed for the supply of light.

In the report to be presented at the seventh ordinary general meeting of Meters Limited, to be held in Manchester on the 17th inst., the Directors state that the trading in the twelve months ending the 31st of March resulted in a gross profit of £38,696, which is reduced by general management expenses, directors' fees, legal charges, expenses on patents, income-tax, and depreciation of buildings, machinery, and plant. A sum of £3811 was spent out of revenue during the year on repairs and renewals. After providing for interest on the debenture stock, the net profit amounts to £27,036, which, with £2601 brought forward, makes £29,637. Out of this sum, interim dividends at the rate of 5½ per cent. per annum upon the preference shares, and at the rate of 5 per cent. per annum upon the ordinary shares, were paid in November last; and the Directors recommend the payment of further dividends at the rates of 5½ and 7 per cent. (making the ordinary dividend 6 per cent. for the year), the addition of £10,000 to the reserve fund (bringing it up to £35,000), and the carrying forward the balance of £3022.

The "MAIN" Gas Cooker

WITH LATEST DEVELOPMENTS.

SPECIAL FEATURES.

OUR NEW PATENT ENAMEL is guaranteed free from Lead or other Poisonous Chemicals.

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Borings for coal some years ago near Calais were without practical result. Recent investigations near Etaples have only led to the discovery of a water supply, which will be utilized by the Municipality of that town.

Messrs. Joseph Taylor and Co. have received orders for the supply and erection of 1½-inch solid plate lead saturators of their latest make, with 1⅜-inch thick bottoms, for the Rothesay, Broughty Ferry, and Motherwell Gas-Works.

The Directors of the Oriental Gas Company, Limited, have resolved to pay an interim dividend at the rate of 3½ per cent., free of income-tax, on account of the year ending the 30th of June next. The dividend is at the same rate as last year.

Mr. Henry Hoare has been appointed by Messrs. Ashmore, Benson, Pease, and Co, their travelling representative. Mr. Hoare was till lately the Assistant Manager and Engineer of the Perth (West Australia) Gas and Electric Lighting Company.

The Coventry Gas Department are handing over a sum of £1000 in relief of the rates, as the result of the working during the past year, as against nothing for the preceding twelve months. There is also no deficiency to provide for in the Electric Light Department, which in 1902-3 required an amount of £466.

The Gorleston and Southtown Gas Company have placed an order for two purifiers, 15 feet square, on Green's system, with Messrs. Robert Dempster and Sons, Limited, of Elland, who have also received an order from the Beverley Corporation for a new purifier on this plan, and for converting four water-lute purifiers to the dry-lute system.

The Corporation of Sandwich have approved an order recently given by the Gas Committee, upon the recommendation of Mr. T. Ebenezer Pye, the Engineer and Manager, for two settings of segment retorts with shallow generator furnaces. Hitherto the Gas Department have used direct-fired furnaces and moulded retorts. The contract has been placed with Drakes Limited.

Water purification at St. Louis has recently been very difficult on account of the quantity of silt in the raw river water, which reached 6000 parts per million. The water is clarified by sedimentation, and recently coagulation has also been tried. Sulphate of iron and lime have been used. At first there was some trouble in the details of the process; but this has been overcome. The chemicals are now added at the rate of 2 grains of sulphate of iron and 6 grains of lime to the gallon; while at East St. Louis the same water is being dosed with 10 grains of alum and 1½ grains of lime, with results which are reported to be less satisfactory.

Messrs. William Sugg and Co. have received an order from the Midland Railway Company for a gas-engine pressure increaser and high-pressure burners for the lighting of the new Sheffield station. The new Public Market Hall at Aberdare has also just been lighted with Messrs. Sugg's high-pressure gas incandescent lamps. The large hall, 170 feet by 70 feet, is brilliantly illuminated by eight 1000-candle power lights; and the small hall, 58 feet by 58 feet, by two similar lights. The pressure-increasing plant consists of a Sugg water-driven apparatus, 20,000-candle power size, and has been installed to provide for further extensions. The work has been carried out by local fitters, under the supervision of Messrs. Sugg and Co.

According to the Special Correspondent of "The Times" who recorded for that paper the leading incidents in His Majesty the King's recent visit to Ireland, the manner in which many of the buildings in Kilkenny were illuminated was an excellent display of good taste. "But best of all," he says—"indeed worthy to be ranked among things really memorable for their soft beauty—was the illumination of the bridge across the river. Seen from below, when arches and balustrades were outlined in fairy lights, and these were reflected faithfully on the smooth surface of the river gliding below, the effect was simply wonderful." The piece of work which called forth these appreciative remarks was carried out by Mr. J. Richmond, the Manager of the Kilkenny Gas Company.

WANTED, FOR SALE, CONTRACT, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Situations Vacant.

ASSISTANT GAS AND WATER MANAGER. Barrow-in-Furness Corporation. Applications by May 17.
AGENT FOR FIRE-CLAY GOODS. No. 4204.
BLACKSMITH AND WORKS FITTER. Farnham Gas-Works.
GAS-FITTER. Farnham Gas-Works.

Situations Wanted.

COLLIERY REPRESENTATIVE OR AGENT. No. 4206.
MANAGER OR WORKING MANAGER. No. 4203.
WORKING MANAGER OR ASSISTANT MANAGER. Vest, Beaufort.

Plant for Sale.

CONDENSER (250,000 feet). Redditch Gas-Works.
METER. Ashford Gas Company. Tenders by May 20.
PURIFIERS, &c. Blyth and Cowpen Gas Company.
RETORTS. Stretford Gas-Works.
SULPHATE OF AMMONIA PLANT. Arbroath Gas Department.

Plant, &c., Wanted.

PURIFIERS. Brackley Gas-Works.
RETORT. No. 4205.

Company Meeting.

PORTSMOUTH WATER COMPANY. Offices, May 26. Three o'clock.

Mortgage Wanted. Blyth, Dutton, Hartley, and Blyth, London.

Shares Wanted. Martin, Streatham.

Stocks and Shares for Sale.

CANTERBURY GAS AND WATER COMPANY. May 18.
CHIGWELL, LOUGHTON, AND WOODFORD GAS COMPANY. May 17.
DEAL AND WALMER COMPANY. May 24.
GREAT YARMOUTH GAS COMPANY. May 17.
HORNSEY GAS COMPANY. May 17.
LEA BRIDGE GAS COMPANY. May 17.
REDDITCH GAS COMPANY. June 2.
SOUTH ESSEX WATER COMPANY. May 17.
SOUTHEND WATER COMPANY. May 17.
SWANAGE GAS AND WATER COMPANY. May 17.

TENDERS FOR

Benzol and Benzolized Creosote.

DARWEN GAS DEPARTMENT. Tenders by May 27.
WALSALL GAS DEPARTMENT. Tenders by May 28.

Brass Fittings, Main Taps, Locks, &c.

DARWEN GAS DEPARTMENT. Tenders by May 27.
PONTYPRIDD GAS DEPARTMENT. Tenders by June 6.

Breeze.

SWANSEA GAS COMPANY.

Coal and Cannel.

BARROW-IN-FURNESS CORPORATION. Tenders by May 18.
DARWEN GAS DEPARTMENT. Tenders by May 27.
DEVONPORT GAS DEPARTMENT. Tenders by May 25.
DRONFIELD GAS COMPANY. Tenders by May 27.
FENTON GAS DEPARTMENT. Tenders by May 19.
HAVERHILL GAS DEPARTMENT. Tenders by May 17.
LIVERPOOL GAS COMPANY. Tenders by May 16.
MANSFIELD GAS DEPARTMENT. Tenders by May 30.
MORLEY GAS DEPARTMENT. Tenders by May 14.
PRIMITIVA GAS AND ELECTRIC LIGHTING COMPANY.
RICHMOND (SURREY) TOWN COUNCIL. Tenders by May 30.
SOWERBY BRIDGE GAS DEPARTMENT. Tenders by May 25.
TIPTON GAS DEPARTMENT. Tenders by May 16.
UXBRIDGE AND HILLINGDON GAS COMPANY. Tenders by May 18.
WALSALL GAS DEPARTMENT. Tenders by May 28.
WARE GAS COMPANY. Tenders by June 4.

Engines (Gas).

LEEDS GAS DEPARTMENT. Tenders by May 18.

Fire-Clay Goods.

PONTYPRIDD GAS DEPARTMENT. Tenders by June 6.

Gasholder.

SHEFFIELD GAS COMPANY. Tenders by June 6.

General Stores, Oils, Ironmongery, &c.

PONTYPRIDD GAS DEPARTMENT. Tenders by June 6.

Incandescent Lighting Goods.

PONTYPRIDD GAS DEPARTMENT. Tenders by June 6.

Lamps.

PONTYPRIDD GAS DEPARTMENT. Tenders by June 6.

Lime.

LEEDS GAS DEPARTMENT. Tenders by May 18.
PONTYPRIDD GAS DEPARTMENT. Tenders by June 6.
WALSALL GAS DEPARTMENT. Tenders by May 28.

Meters.

PONTYPRIDD GAS DEPARTMENT. Tenders by June 6.

Meter House.

TYLDESLEY-WITH-SHAKERLEY URBAN DISTRICT COUNCIL. Tenders by May 21.

Oil for Gas Making.

BARROW-IN-FURNESS CORPORATION. Tenders by May 18.
LEEDS GAS DEPARTMENT. Tenders by May 18.

Pipe Laying.

TYLDESLEY-WITH-SHAKERLEY URBAN DISTRICT COUNCIL. Tenders by May 21.

Pipes (Iron, Lead, and Compo.) and Specials.

DARWEN GAS DEPARTMENT. Tenders by May 27.
EXMOUTH GAS COMPANY. Tenders by May 17.
PONTYPRIDD GAS DEPARTMENT. Tenders by June 6.
TYLDESLEY-WITH-SHAKERLEY URBAN DISTRICT COUNCIL. Tenders by May 21.

Steel and Iron Work, &c.

COLNE GAS DEPARTMENT. Tenders by May 16.
PONTYPRIDD GAS DEPARTMENT. Tenders by June 6.

Sulphuric Acid.

EDINBURGH AND LEITH GAS COMMISSIONERS. Tenders by May 16.

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DARWEN GAS DEPARTMENT. Tenders by May 27.
FENTON GAS DEPARTMENT. Tenders by May 19.
MANSFIELD GAS DEPARTMENT. Tenders by May 30.

Valves and Hydrants.

PONTYPRIDD GAS DEPARTMENT. Tenders by June 6.
TYLDESLEY-WITH-SHAKERLEY URBAN DISTRICT COUNCIL. Tenders by May 21.

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"VOLCANIC" FIRE CEMENT.

Resists 4500° Fahr. Best for GAS-WORKS.

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J. B. MACDERMOTT, 11, Bothwell St., GLASGOW.

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COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office NOT LATER than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or stoppages of, PERMANENT ADVERTISEMENTS should be received by the FIRST POST on SATURDAY.

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HYDRATED OXIDE OF IRON.
PREPARED from Pure Iron.
Twice as Rich as Bog Ore.
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The Cheapest in the Market.
Can be Lent on Hire.
Can be Exchanged for Spent Oxide.
READ HOLLIDAY AND SONS, LTD., HUDDERSFIELD.

AMMONIACAL LIQUOR wanted.
BROTHERTON AND CO., LTD., Ammonia Distillers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

PATENTS AND TRADE MARKS PUBLICATIONS, "MERCHANDISE MARKS ACT, and Decisions thereunder," 1s.; "TRADE SECRETS v. PATENTS," 6d.; "DOCTRINE of EQUIVALENTS, Mechanical and Chemical," 6d.; SUBJECT-MATTER of PATENTS," 6d.
MEWBURN, ELLIS, & PRYOR, Chartered Patent Agents, 70 and 72, Chancery Lane, London, W.C. Telegrams: "Patent London." Telephone: No. 243 Holborn.

GAS TAR wanted.
BROTHERTON AND CO., LTD., Tar Distillers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

PENNY-IN-THE-SLOT WORK.
H. GREENE & SONS, Ltd., are pre- pared to give QUOTATIONS to Gas Companies or Corporations for FITTING UP COMPLETE and CARRYING OUT the WORK in its entirety, either in Iron or Compo.
SURREY ENGINEERING WORKS, BLACKFRIARS ROAD, LONDON, S.E.
Telephone: 1693 HOP. Telegrams: "LUMINOSITY."

COAL GAS TAR wanted.
ROBINSON BROTHERS, LIMITED. Works: WEST BROMWICH, KNOTTINGLEY, and SPONDON.

SITUATION wanted as Working MANAGER in Small Works, or ASSISTANT MANAGER in large Works. Used to Regenerators, Engines, and Exhausters. Good Carbonizer, Main and Service Layer, and all-round Fitter. Highest References. No objection to going Abroad.
Address VEST, 2, Chappel Road, BEAUFORT.

WANTED, a Competent Man as Black- SMITH and WORKS FITTER. Must be able to do general repairs to Gas-Works Plant and lay Mains and Services; also a Young Man as GAS-FITTER, well up in all Internal Fitting Work, Iron and Compo, the fixing of Meters, Stoves, Gas-Fires, Prepayment Meter Installations, and thoroughly acquainted with Incandescent Lighting.
Apply, stating Age, Experience, and Wages required, to S. J. SYMONDS, Manager, Gas-Works, Farnham, SURREY.

ROBERT DEMPSTER & SONS, Ltd., Contractors for Complete CARBONIZING PLANTS and every description of GAS APPARATUS and ELEVATING and CONVEYING PLANT, ROSE MOUNT IRON-WORKS, ELLAND.

ASSISTANT FOR GAS-WORKS IN MIDLANDS.
APPLICANTS for above to No. 4184 are THANKED, and informed that the appointment HAS NOW BEEN MADE.

WANTED, Re-engagement as Gas MANAGER or WORKING MANAGER. Twenty-Six Years in present Situation. Thorough knowledge of Erections, Extensions, Mains, and Services. Good Carbonizer. Member of E.C.G.M.A.
Address No. 4203, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TO Gas Coal Factors and Colliery Proprietors. Advertiser, age 32, Energetic, well in touch with Gas Companies in Midland and Eastern Counties, and who thoroughly knows the business, desires appointment as REPRESENTATIVE or AGENT.
Address No. 4206, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

AGENT Wanted by an Old-Established firm of Gas-Retort and Fire-Clay Goods Manufacturers for London and South of England. Preference given to one who has knowledge of the trade.
Apply, by letter, giving Reference and Terms required, to No. 4204, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

BOROUGH OF BARROW-IN-FURNESS.
THE Corporation invite Applications for the appointment of ASSISTANT-MANAGER of the Gas and Water Works. Salary £130 per Annum.
Applicants must be competent Draughtsmen, and have a thorough knowledge of Gas Making and Main and Service Laying.
Applications, in own handwriting, stating Age, Experience, present and previous occupation, and accompanied by *copies* of not more than Three Recent Testimonials, to be addressed to the Chairman of the Gas and Water Committee, endorsed "Assistant-Manager," and delivered at the Town Clerk's Office, not later than Tuesday, the 17th of May, 1904.
Canvassing Members of the Council will be a disqualification.
By order,
C. F. PRESTON,
Town Clerk.
Town Hall, Barrow-in-Furness.

WANTED, a Cast-Iron Gas-Retort for experimental purposes.
State Particulars of size, &c., and lowest price, to No. 4205, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED to purchase Gas Shares, STOCK, or DEBENTURES of any good dividend-paying Company; also Water-Works Shares and Debentures. Size and location of Company immaterial. Securities that have failed to realize reserves at auction considered.
Address Mr. MARTIN, 41, Shubbery Road, Streatham, LONDON.

GAS-PURIFIERS.
WANTED, 3 or 4 Second-Hand Puri- FIERS, with loose trays for Gas Lime, about 10 feet by 8 feet. Must be in good condition.
State exact measurement offered, and lowest price delivered, also say where can be seen, to JOHN G. CLARKE, Gas-Works, BRACKLEY.

PURIFIERS.
THE Blyth and Cowpen Gas Company have FOR DISPOSAL a set of Four PURIFIERS, each 10 feet square, with 10-inch Connections, Dry Faced Centre and Check Valves, Girders, and Lifting Gear for same. Erected by R. Dempster and Sons, Elland.
Offers to A. C. FAWCETT, Secretary to the Company, Blyth, NORTHUMBERLAND.

A GOOD, Second-hand "Pettigrew's" SULPHATE PLANT FOR SALE—Ammonia Still, Liming Chamber, and Superheater. To be disposed of to make room for larger plant. In Good Condition, and can be seen in working order at the Arbroath Gas-Works.
A grand opportunity for Works proposing to Manufacture Sulphate of Ammonia.
Offers to, and full particulars from, Mr. Alex. C. Young, Gas Manager, ARBROATH, N.B.

RETORTS FOR SALE.
TEN 10-feet lengths of 19-in. by 15-in. D RETORTS FOR SALE. Best Stourbridge make.
Offers to GAS ENGINEER, STRETFORD.

CONDENSER for Sale. In splendid Condition. Cheap. Capacity 250,000 Cubic Feet per Twenty-four hours.
Apply to A. E. LAYTON, Manager, Gas-Works, REDDITCH.

TO BRICK AND CEMENT MAKERS AND OTHERS.
THE Swansea Gaslight Company have FOR SALE good ordinary COKE BREEZE, for shipment, or on rail.
Apply to the MANAGER, Gas-Works, SWANSEA.

£2500 to £3000 required. First Mortgage. Four-and-a-Half per cent. Interest, payable Half Yearly. Security: Good paying Gas-Works, Provisional Order.
Apply to Messrs. BLYTH, DUTTON, HARTLEY, AND BLYTH, Solicitors, 112, Gresham House, Old Broad Street, LONDON, E.C.

A 10,000 cubic feet per hour Wet Meter is FOR SALE at the Ashford (Kent) Gas-Works The same is Messrs. Milne and Sons' make, and is being removed for larger Meter. Can be seen in use at the Works.
Tenders, on or before May 20, to
J. MORTON.
May 7, 1904.

HORNSBY Akroyd Oil-Engine, portable type, 12½ N.H.P., complete on strong wrought-iron frame and wheels, practically new.
BLACKSTONE OIL-ENGINE, 3½ H.P. Horizontal.
Three GARDNER GAS-ENGINES, 10 and 4½ H.P., with Tank and Fittings Complete, and all equal to new.
Write J. WRIGHT, 181, Queen Victoria Street, LONDON, E.C.

GAS PLANT for Sale—I can always offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.
J. F. BLAKELEY, Gas Engineer, Thornhill, DEWSBURY.

SHEFFIELD UNITED GASLIGHT COMPANY.

GASHOLDER.

THE Directors of the above Company are prepared to receive TENDERS for a GAS-HOLDER, 247 feet diameter by 166 feet high, to be erected at their Neepsend Works.
Drawings and Specification may be obtained from the Company's Engineer (Mr. John W. Morrison) on payment of Two Guineas, which will be returned on receipt of a *bonâ-fide* Tender together with the Drawings and Specification.
Sealed Tenders and priced out schedule, marked "Tender for Gasholder," and addressed to the undersigned, must be delivered by post not later than the first post on Monday, June 6.
The Directors do not bind themselves to accept the lowest or any Tender.
HANBURY THOMAS,
General Manager and Secretary.
Commercial Street, Sheffield,
May 5, 1904.

SOWERBY BRIDGE URBAN DISTRICT COUNCIL.

(GAS DEPARTMENT.)

TENDERS FOR CANNEL AND COAL.

THE Gas Committee are prepared to receive TENDERS for the supply and delivery of 1400 Tons of CANNEL and 14,600 Tons of best screened GAS COALS, or such quantity as may be required for the Gas-Works at Sowerby Bridge and Luddenden Foot during the period of Twelve Months between the 1st day of June, 1904, and the 31st of May, 1905.
Tenders will be received for the whole or any portion of the above quantity.
Specifications, Forms of Tender, and all Information can be obtained on application to the Engineer, Mr. A. W. Bissell, Gas-Works, Sowerby Bridge.
The Gas Committee reserve the right to accept Tenders for the whole or any portion of the quantity offered, and do not bind themselves to accept the lowest or any Tender.
Sealed Tenders, endorsed "Tender for Coal" or "Cannel," to be delivered not later than Twelve o'clock noon on Wednesday, May 25, 1904, and addressed to
R. W. EVANS,
Solicitor and Clerk to the Council,
Commercial Bank Chambers, Halifax,
May 5, 1904.

DEVONPORT CORPORATION.
(Gas Department.)

THE Gas Committee of the Devonport Corporation are prepared to receive TENDERS for the supply of 35,000 Tons of Durham GAS COAL, to be delivered during the Year ending the 30th of June, 1905.

The Coal is to be delivered c.i.f. at Tamar Wharf, Devonport; and Forms of Tender and Specification may be obtained from the undersigned.

Sealed Tenders, endorsed "Tenders for Coal," and addressed to R. J. Fittall, Esq., Town Clerk, Devonport, are to be delivered at the Town Clerk's Office, on or before the 28th day of May, 1904.

Sidney E. Stevenson,
Engineer and Manager.

Gas-Works, Devonport.

LEEDS CORPORATION GAS-WORKS.

THE Gas Committee are prepared to receive TENDERS for the supply of GAS OIL, for the manufacture of Carburetted Water Gas, for a period of One or Two Years, commencing the 1st of July next.

Specification and Conditions of Tender may be obtained on application to the undersigned.

Tenders and samples, addressed to the Chairman of the Gas Committee, and endorsed "Gas Oil," must be delivered at the Gas Offices, East Parade, Leeds, on or before Wednesday, the 18th inst.

The Committee do not bind themselves to accept the lowest or any Tender.

R. H. Townsley,
General Manager.

Gas Offices, Leeds,
May 7, 1904.

LEEDS CORPORATION GAS-WORKS.

THE Gas Committee are prepared to receive TENDERS for the supply of about 11,000 Tons of Craven or Derbyshire LIME required for the Purification of Gas at the several Gas-Works during the Twelve Months commencing on the 1st of July, 1904.

Forms of Tender may be obtained on application to the undersigned.

Tenders, addressed to the Chairman of the Gas Committee, and endorsed "Lime," must be delivered at the Gas Offices, East Parade, Leeds, on or before Wednesday, the 18th inst.

The Committee do not bind themselves to accept the lowest or any Tender.

R. H. Townsley,
General Manager.

Gas Offices, Leeds,
May 7, 1904.

LEEDS CORPORATION GAS-WORKS.

THE Gas Committee are prepared to receive TENDERS for the supply, delivery, and fixing at the New Wortley Gas-Works, of Two 70-B.H.P. GAS-ENGINES.

Tenders and Specifications, addressed to the Chairman of the Gas Committee and endorsed "Gas-Engines," must be delivered at the Gas Offices, East Parade, Leeds, on or before Wednesday, the 18th inst.

The Committee do not bind themselves to accept the lowest or any Tender.

R. H. Townsley,
General Manager.

Gas Offices, Leeds,
May 7, 1904.

TYLDESLEY-WITH-SHAKERLEY URBAN DISTRICT COUNCIL.

TO CONTRACTORS, BUILDERS, AND OTHERS.

THE Council invite Tenders for the construction of a 15-inch WATER-MAIN, as follows:—

From the Thirlmere Aqueduct, Clegg's Lane, Little Hulton, to the existing main in Sale Lane, Tyldesley, distance 3029 yards.

Also for the construction of a METER-HOUSE in Clegg's Lane.

Plans, Sections, and Specifications may be seen, and Bills of Quantities and Forms of Tender obtained, on and after Monday, the 9th inst. (on deposit of cheque for One Guinea, which will be returned on receipt of a *bonâ-fide* Tender), upon application to Mr. J. Brooke Smith, the Council's Engineer and Surveyor.

No Tender will be considered unless made on the prescribed Form.

Sealed Tenders, endorsed "Tender for Construction of Water-Main," to be delivered at my Office before Twelve noon on Saturday, the 21st day of May, 1904.

The Council will not be bound to accept the lowest or any Tender.

By order,
W. J. Matthews,
Clerk.

Tyldesley, Manchester,
May 6, 1904.

TYLDESLEY-WITH-SHAKERLEY URBAN DISTRICT COUNCIL.

TO ENGINEERS, CONTRACTORS, AND OTHERS.

THE Council invite Tenders for the supply of about 3029 yards of 15-inch Cast-Iron WATER-PIPES and SLUICE VALVES and HYDRANTS.

Specifications may be seen, and Forms of Tender obtained, on and after Monday the 9th inst. (on deposit of cheque for One Guinea, which will be returned on receipt of a *bonâ-fide* Tender), upon application to Mr. R. H. Ginman, the Council's Water Engineer.

No Tender will be considered unless made on the prescribed Form.

Sealed Tenders, marked "Water-Pipes," to be delivered at my Office before Twelve noon on Saturday, the 21st day of May, 1904.

The Council will not be bound to accept the lowest or any Tender.

By order,
W. J. Matthews,

Tyldesley, Manchester,
May 6, 1904.

MORLEY CORPORATION.
(Gas Department).

TENDERS FOR COAL.

THE Gas Committee of the above Cor- poration are prepared to receive TENDERS for the supply of 13,000 Tons of best GAS COAL during the Year ending the 30th of June, 1905.

Forms of Tender may be obtained on application to Mr. H. J. Hemingway, Town Hall, Morley.

Endorsed Tenders to be sent to the undersigned not later than Saturday, the 14th of May.

Fred Thackray,
Town Clerk.

Town Hall, Morley,
May 7, 1904.

FENTON URBAN DISTRICT COUNCIL.

TENDERS FOR GAS COAL.

THE Gas Committee of the above Council invite TENDERS for the supply and delivery of 8000 Tons of GAS COAL, BURGY, NUTS, or BEANS, for the Twelve Months commencing the 1st of July next.

Specification and Form of Tender may be obtained on application to the undersigned.

Sealed Tenders, endorsed "Coal," to be forwarded to the Chairman, Gas-Works, Fenton, Staffs., not later than Thursday, May 19, 1904.

The lowest or any Tender not necessarily accepted.

Robert Surtees,
Engineer and Manager.

Gas-Works, Fenton, Staffs.,
May 6, 1904.

FENTON URBAN DISTRICT COUNCIL.

TAR AND AMMONIACAL LIQUOR.

THE Gas Committee of the above Council invite TENDERS for the purchase of the surplus TAR and AMMONIACAL LIQUOR made at their Works during the Twelve Months commencing the 1st day of July next.

Sealed Tenders to be sent in not later than Thursday, May 19, 1904, addressed Chairman, Gas-Works, Fenton, Staffordshire, and endorsed "Tender for Tar, &c."

The Committee reserve to themselves the right of accepting any Tender for the Tar or Liquor separately.

The Committee do not bind themselves to accept the highest or any Tender.

Further Particulars may be obtained on application to the undersigned.

Robert Surtees,
Engineer and Manager.

Gas-Works, Fenton, Staffs.,
May 6, 1904.

BOROUGH OF WALSALL.

TENDERS FOR BENZOL AND FOR BENZOLIZED CREOSOTE.

THE Corporation of Walsall invite TENDERS for about 8000 Gallons of 90 per cent. BENZOL for enriching purposes; and also Tenders for 2000 Gallons of BENZOLIZED CREOSOTE, free from Naphthalene, to be delivered during One Year from July 1 next, in drums or in casks, to the Corporation sidings at the Pleck Gas-Works, Walsall.

Further Particulars may be obtained from the Engineer at the Pleck Gas-Works, Walsall.

The Corporation do not bind themselves to accept any Tender, and they reserve the right to divide the Contract between several firms.

Tenders, sealed and marked outside "Tender for Benzol," or "Tender for Benzolized Creosote," are to be sent to the undersigned not later than Saturday, the 28th of May inst.

When tendering for the Benzol, the amount of purity should be stated.

John R. Cooper,
Town Clerk.

Borough Offices, Walsall,
May 6, 1904.

BOROUGH OF WALSALL.

TO LIME MASTERS.

THE Corporation of Walsall invite TENDERS for the supply of about 1200 Tons of LIME, which will be required at their Gas-Works during One Year from the 1st of July next; the deliveries to be in such monthly quantities as the Manager of the Gas-Works may from time to time direct.

The Lime is to be hand-picked and clear from Refuse and Ashes, and to be delivered at the Corporation siding at the Pleck Gas-Works as required.

Payments monthly.

Tenders, sealed and marked outside, "Tender for Lime," are to be sent to the undersigned on or before Saturday, the 28th of May inst.

John R. Cooper,
Town Clerk.

Borough Offices, Walsall,
May 6, 1904.

BOROUGH OF WALSALL.

TENDERS FOR GAS COAL.

THE Corporation of Walsall invite TENDERS for the supply of 30,000 Tons of good screened GAS COAL, and 18,000 Tons of screened GAS NUTS, to be delivered during One Year from the 1st of July next, at the Corporation Siding at the Pleck Gas-Works, Walsall, as may be required.

Forms of Tender and Specification may be obtained on application to the undersigned.

The Corporation do not bind themselves to accept any Tender; and they reserve the right to divide the Contract between several firms.

Tenders, sealed and marked outside "Tender for Gas Coal," and stating the price for large Coal, and also for Nuts, are to be sent to the undersigned on or before Saturday, the 28th of May inst.

John R. Cooper,
Town Clerk.

Borough Offices, Walsall,
May 6, 1904.

BOROUGH OF DARWEN.

TENDERS FOR GAS SLACK.

THE Gas Committee of the above Cor- poration are prepared to receive TENDERS for the supply of GAS SLACK, PEAS, and NUTS, for One Year, to be delivered at the Gas-Works Siding in the Corporation Waggons.

Forms of Tender and all Information as to quantities may be obtained on application to Mr. A. H. Smith, Gas Engineer, Darwen.

Sealed Tenders, endorsed "Gas Slack," must be delivered to the undersigned not later than the 27th of May, 1904.

No Tender necessarily accepted.

By order,
William P. Halliwell,
Town Clerk.

Town Clerk's Office,
Darwen, April 26, 1904.

BOROUGH OF DARWEN.

TENDERS FOR TAR.

THE Gas Committee of the above Cor- poration are prepared to receive TENDERS for all the surplus TAR produced at their Gas-Works for One Year.

Further Particulars and Forms of Tender may be obtained on application to Mr. A. H Smith, Gas Engineer, Darwen.

Sealed Tenders, endorsed "Tender for Tar," must be delivered to the undersigned not later than the 27th of May, 1904.

The highest or any Tender not necessarily accepted.

By order,
William P. Halliwell,
Town Clerk.

Town Clerk's Office,
Darwen, April 26, 1904.

BOROUGH OF DARWEN.

THE Gas Committee of the above Cor- poration are prepared to receive TENDERS for the supply of the following GOODS for One Year—

BENZOL.
WROUGHT-IRON TUBES AND FITTINGS.
BRASS FITTING.
CAST-IRON MAINS AND SPECIALS.

Further Particulars and Forms of Tender may be obtained on application to Mr. A. H. Smith, Gas Engineer, Darwen.

Sealed and endorsed Tenders must be delivered to the undersigned not later than the 27th of May, 1904.

The lowest or any Tender not necessarily accepted.

By order,
William P. Halliwell,
Town Clerk.

Town Clerk's Office,
Darwen, April 26, 1904.

BOROUGH OF BARROW-IN-FURNESS.

SUPPLY OF COAL AND CANNEL.

THE Corporation are prepared to receive TENDERS, on forms to be obtained at the Office of the Gas and Water Manager, for the supply of screened GAS COAL and CANNEL for the Year ending the 30th of June, 1905.

Tenders, addressed to the Chairman of the Gas and Water Committee, and endorsed "Tender for Coal," to be delivered at the Town Clerk's Office, not later than Twelve o'clock noon on Wednesday, the 18th day of May, 1904.

The lowest or any Tender not necessarily accepted.

By order,
C. F. Preston,
Town Clerk.

Town Hall, Barrow-in-Furness.

BOROUGH OF BARROW-IN-FURNESS.

SUPPLY OF GAS OIL.

THE Corporation are prepared to receive TENDERS for the supply of about 300 to 400 Tons of OIL, suitable for the manufacture of Carburetted Water Gas, delivered free at the Gas-Works Siding, in such quantities and at such times as may be required during the period ending the 30th of June, 1905.

Sealed Tenders, addressed to the Chairman of the Gas and Water Committee, and endorsed "Tender for Oil," to be delivered at the Town Clerk's Office, not later than Twelve o'clock noon on Wednesday, the 18th of May, 1904.

The lowest or any Tender not necessarily accepted.

By order,
C. F. Preston,
Town Clerk.

Town Hall, Barrow-in-Furness.

PONTYPRIDD URBAN DISTRICT COUNCIL
(Gas Department.)

THE Gas Committee invite Tenders for the supply of the following STORES and MATERIALS required during the Year ending June 30, 1905—

5—Fire-Clay Goods, Lime, &c.	12—Dry Meters.
6—Iron Tubing.	13—Main Taps and Locks.
7—Lead and Compo.	14—Steam-Valves.
8—Iron and Steel.	15—Castings.
9—Oils and Drysaltery.	16—Incandescent Lighting Goods.
10—Brass Fittings and Sundries.	17—Ironmongery.
11—Slot Fittings.	18—Lamps.

Forms of Tender and any Information required may be obtained from Mr. Edward Jones, Gas Engineer, Treforest Gas-Works, Treforest, near Pontypridd.

No Tenders, other than those upon the Forms issued by the Council, will be considered.

Sealed Tenders, endorsed "Tender No. 5, 6, 7, 8, 9, &c.," as the case may be, must be received by the undersigned, not later than June 6, 1904.

J. Colenso Jones,
Clerk.

Council Chambers,
Pontypridd.

COUNTY BOROUGH OF BLACKBURN.
(Gas Department.)

THE Gas Committee are prepared to receive TENDERS for the purchase of the surplus TAR produced at their Gas-Works during the Year ending June 30, 1905.

Probable quantity, about 3200 Tons.

The Tar will be loaded into Contractors' Tank-Waggons at the Greenbank Gas-Works Private Sidings.

Tender Forms on application to the undersigned, and to be delivered at this Office, endorsed "Tender for Tar," on or before the 16th inst.

S. R. Ogden,
Engineer and Manager.

Municipal Offices,
Blackburn, May 3, 1904.

TIPTON URBAN DISTRICT COUNCIL.
(Gas Department.)

THE Gas Committee invite Tenders for the supply and delivery of 11,000 Tons of good screened GAS COAL, NUTS, &c.

Forms of Tender may be had on application to the undersigned; and only offers on our own Forms will be considered.

Tenders, endorsed "Gas Coal," and addressed to the Chairman of the Gas Committee, to be received here not later than the first post on Monday, May 16, 1904.

The lowest or any Tender will not necessarily be accepted.

By order,
Sidney O. Stephenson,
Engineer and Manager.

Gas-Works, Tipton,
May 2, 1904.

EDINBURGH AND LEITH CORPORATIONS' GAS COMMISSIONERS.

SULPHURIC ACID.

THE Commissioners are prepared to receive TENDERS for the supply, over a period of One, Three, or Five Years, at Commissioners' option, of from 2000 to 2500 Tons Yearly of SULPHURIC ACID suitable for the Manufacture of Sulphate of Ammonia.

Delivery to be made in Tank-Waggons or Carboys at the Commissioners' Sidings at Granton, on the Caledonian or North British Railway.

Full Particulars may be obtained on application to Mr. W. R. Herring, Chief Engineer and Manager, New Street Gas-Works.

Tenders to be lodged not later than Ten a.m. on Monday, the 16th curt., sealed and endorsed "Tender for Sulphuric Acid," and addressed to the undersigned.

The Commissioners do not bind themselves to accept the lowest or any Offer.

James M'G. Jack,
Clerk.

25, Waterloo Place,
Edinburgh, May 3, 1904.

UXBRIDGE AND HILLINGDON GAS CONSUMERS' COMPANY.

TENDERS FOR COAL.

THE Directors of the above Company invite TENDERS for the supply of about 6500 Tons of GAS COAL per Annum for One, Two, or Three Years, deliveries of which are to commence in July, 1904, and finish the last week in June, 1905, or each subsequent Year.

Tenders to be made out for the above quantity of the best description of screened or unscreened Gas Coal, either in whole or part, from, or divided between, the Durham, Yorkshire, or Derbyshire Pits, delivered by barge free alongside the Company's Works on the Grand Junction Canal, or by rail to Uxbridge Station (Great Western Railway).

Tenders are to state the names of the Pits from which the above description of Coal will be supplied; deliveries to be according to the instructions, and to the entire satisfaction, of the Company's Engineer.

Tenders to be received on or before the 18th day of May, 1904, addressed to the Chairman, Gas Offices, Belmont Road, Uxbridge, Middlesex, and endorsed "Tender for Coal."

No Form of Tender sent.

W. M. Gardiner,
Secretary.

Uxbridge, Middlesex,
May 6, 1904.

BOROUGH OF RICHMOND (SURREY) WATER-WORKS AND PUBLIC BATHS.

TENDERS FOR SMOKELESS WELSH STEAM COAL.

THE Town Council of the Borough of Richmond (Surrey) invite TENDERS for the supply of about 1450 Tons of best WELSH SMOKELESS COAL, to be delivered in barges of about 40 Tons alongside the Wharf opposite the Water-Works, Richmond, for One Year from the 1st day of July, 1904, and the 30th day of June, 1905.

The seam and district from which the Coal is to be supplied must be stated in the Tender.

Particulars and Forms of Tenders can be obtained of Mr. W. G. Peirce, Borough Water-Works Engineer, at the Water-Works.

No Tender will be recognized unless it is made on the prescribed Form, properly filled up in every respect; and no expenses or claim will be allowed or paid to any person whether tendering or not.

The security stipulated by the Public Health Act, 1875, for the due performance of the contract will be required, and the Contract and Bond will be prepared by the Town Clerk.

Sealed Tenders, endorsed "Tenders for Welsh Coal," and addressed to the Chairman of the Water Committee, Borough of Richmond (Surrey), must be delivered at the Town Clerk's Office by Ten o'clock on Monday, the 30th of May, 1904.

The Council do not bind themselves to accept the lowest or any Tender.

Fredk. B. Senior,
Town Clerk.

Town Clerk's Office,
Town Hall, Richmond (Surrey).

THE Ware Gas Company, Limited, invite TENDERS for the supply of from 1800 to 2000 Tons of East Pontop, Barrow, Norfolk, or Strafford Silkstone, or Aldwarke Main unscreened GAS COAL, for the Year ending the 24th day of June, 1905.

Particulars may be obtained of the undersigned.

Sealed Tenders to be delivered to me on or before the 4th day of June, prox.

The lowest Tender will not necessarily be accepted.

Dated this 5th day of May, 1904.

Geo. H. Gisby,
Secretary.

Ware, Herts.

EXMOUTH GAS COMPANY.

THE Directors invite Tenders for the supply of 960 yards of 6-inch Cast-Iron Socket and Spigot GAS-PIPES, in 9 feet lengths; also a few SPECIALS, delivered at Exmouth Station.

Tenders, endorsed "Tender for Gas-Pipes," to be sent not later than Tuesday, May 17, 1904, addressed to the Chairman of the Company, and to state the approximate weight per pipe, pressure tested at, the price per ton coated, and the time of delivery.

By order of the Board,
James T. Foster,
Secretary and Manager.

Exmouth, May 5, 1904.

HAVERHILL URBAN DISTRICT COUNCIL.

TENDERS FOR COAL.

THE Haverhill Urban District Council invite TENDERS for the supply of 500, 1000, or 1500 Tons of best GAS COAL (Screened or Unscreened) to be delivered free at the Haverhill (G.E.R.) Station in such quantities and at such periods as may be ordered from time to time between the 1st day of June next and the 31st of May, 1905.

No Form of Tender is provided.

The Council do not bind themselves to accept the lowest or any Tender.

Tenders, endorsed "Gas," to be delivered to me on or before the 17th of May, 1904.

Thomas Bates,
Clerk.

Haverhill, May 2, 1904.

BOROUGH OF COLNE.
(Gas Department.)

TO IRONFOUNDERS, &c.

THE Gas Committee invite Tenders for the supply of the necessary STEEL JOISTS, CAST-IRON FLOOR-PLATES, and other MATERIALS for the extension of the Stage-Floor in No. 2 Retort-House.

Particulars can be obtained from the undersigned on application.

Tenders to be delivered not later than Monday, May 16, 1904, addressed to the Chairman of the Gas Committee, Gas-Works, Knotts Lane, Colne, Lanc.

The lowest or any Tender not necessarily accepted.

Fred Thorpe,
Engineer and Manager.

Gas-Works, Colne, Lanc.,
May 3, 1904.

LIVERPOOL UNITED GASLIGHT COMPANY.

TENDERS FOR CANNEL AND COAL.

THE Directors of the Liverpool United Gaslight Company are prepared to receive TENDERS for the supply of 70,000 Tons of CANNEL, and 220,000 Tons of COAL, to be delivered at the various Works of the Company during the period of Twelve Months, between the 1st of July, 1904, and the 30th of June, 1905.

Tenders will be received for the whole or any portion of the above quantity.

The Directors reserve the right to accept Tenders for the whole or any portion of the quantity offered, and do not bind themselves to accept the lowest or any Tender.

Full Particulars and printed Forms of Tender can be obtained on application to the undersigned, at the Gas Office, Duke Street, Liverpool, to whom Sealed Tenders (on the printed Form only) must be delivered, at or before Ten a.m. on Monday, May 16, endorsed "Tender for Cannel and Coal."

By order,
William King,
Engineer.

Gas Office, Duke Street,
Liverpool, April 13, 1904.

MANSFIELD CORPORATION.
(Gas Department.)

TENDERS FOR GAS COAL AND CANNEL.
TENDERS FOR TAR AND AMMONIACAL LIQUOR.

Coal.

THE Gas Committee are prepared to receive TENDERS for 2000 Tons of CANNEL and 9000 Tons of best screened GAS COAL, delivered at Mansfield Station for One Year from the 1st of June, 1904, to the 31st of May, 1905.

Tar and Liquor.

TENDERS for surplus TAR and LIQUOR made from the 1st of July, 1904, to the 31st of May, 1905. Tenders for Liquor to be made either at a fixed price per Ton or on the sliding-Scale regulated by the price of Sulphate.

Tenders, endorsed "Coals" or "Tar and Liquor," as the case may be, to be sent to J. Harrop White, Esq., Town Clerk, Mansfield, on or before the 30th of May, 1904.

Particulars and all other Information from the undersigned.

NOTE: No Special Form of Tender provided.

The Committee do not bind themselves to accept the lowest or any Tender.

Arthur Graham,
Engineer and Manager.

Gas-Works, Mansfield,
May 6, 1904.

DRONFIELD GASLIGHT AND COKE COMPANY.

THE Directors of the above Company invite TENDERS for the supply of 1000 Tons of best screened GAS COAL, to spread over the Twelve Months ending June 30, 1905. The Coal to be delivered in such quantities and at such times as the Manager may from time to time direct.

Tenders must be sent to me not later than Friday, the 27th inst., sealed and endorsed "Tender for Gas Coal."

Harold White,
Secretary.

BUENOS AYRES (NEW) GAS COMPANY, LIMITED.

NOTICE is Hereby Given, that the Shareholders, at their Ordinary General Meeting held this day, have declared a DIVIDEND of 7 per cent. for the year ended December 31, 1903, of which 3 per cent. was distributed in October, 1903, by way of Interim Dividend, leaving the balance of 4 per cent. (8s. per share) to be paid forthwith, free of Income-Tax; and NOTICE IS HEREBY FURTHER GIVEN to the Holders of Share-Warrants to Bearer of this Company that Coupon No. 28 is payable by the Company's Bankers, the Union of London and Smith's Bank, Limited, 50, Cornhill, E.C., at the rate of 8s. per coupon. Coupons must be left with the Bankers three clear days for examination.

By order,
J. M. Macmorran,
Secretary.

1, East India Avenue,
Leadenhall Street, E.C., May 4, 1904.

IMPERIAL CONTINENTAL GAS ASSOCIATION.
(Incorporated by Act of Parliament.)

NOTICE is Hereby Given, that the Half-YEARLY ORDINARY GENERAL MEETING of the Proprietors of this Association was held at the City Terminus Hotel, Cannon Street, London, on Tuesday, the 3rd inst.—

John Horsley Palmer, Esq., in the Chair,

when the following RESOLUTIONS were unanimously passed:—

"That the Report of the Directors upon the affairs of the Association be received, adopted, and entered upon the Minutes."

"That a Dividend of 5 per cent. for the Half Year ended Dec. 31 last be declared upon the £3,500,000 Capital Stock of the Association, and that the same be payable, free of Income-Tax, on and after the 10th inst."

"That Corbet Woodall, Esq., be re-elected a Director of the Association."

"That Thomas Henry Goodwin Newton, Esq., be re-elected a Director of the Association."

"That Colonel Herman Le Roy Lewis, D.S.O., be re-elected a Director of the Association."

"That Montagu Somes Pilcher, Esq., be re-elected an Auditor of the Association."

Votes of Thanks were passed to the Directors for their able management of the affairs of the Association, to the Chairman for his conduct in the Chair, and to the Staff in London and on the Continent.

By order of the Board,
Robert W. Wilson,
Secretary.

21, Austin Friars, London, E.C.,
May 4, 1904.

BOROUGH OF PORTSMOUTH WATER-WORKS COMPANY.

NOTICE OF HALF-YEARLY MEETING.

NOTICE is Hereby Given, that the next HALF-YEARLY MEETING of the Shareholders in this Company will be held at the Company's Offices, Commercial Road, Portsmouth, on Thursday, the 26th day of May, 1904, at Three o'clock in the Afternoon, on the following Business:—

To receive the Accounts and Balance-Sheets to the 31st of March last, and the Directors' Report.

To declare Dividends.

To elect Directors and one Auditor in the place of those retiring by rotation, and to elect a second Auditor to fill the vacancy caused by the death of Mr. William Payne.

And for the transaction of the other Ordinary Business of the Company.

And to authorize the Directors, if thought fit, to exercise the Company's full Borrowing Powers under all their Acts and Orders, whether on Mortgage or by the issue of Debenture Stock, at such Interest and upon such terms and conditions as the Directors may think fit, and to re-borrow on Mortgage, at such Interest and upon such terms and conditions as the Directors may think fit, any Mortgage Moneys repaid without hereafter obtaining a fresh Resolution of the Shareholders.

The REGISTER OF TRANSFERS WILL BE CLOSED on and after the 19th day of May, 1904, until after the Meeting.

Dated the 28th day of April, 1904.

By Order of the Board of Directors,
J. L. Wilkinson,
Secretary to the Company.

DEAL AND WALMER GAS COMPANY.

ISSUE OF £4700 NEW STOCK.

THE Directors invite Tenders for the purchase of this STOCK, which is entitled to a Maximum Dividend of £5 per cent. per annum.

The paid-up Capital of the Company in Shares and Stock is £36,050.

The full authorized dividends have been regularly paid for the last Twenty Years, with the exception of one Half Year, when 1 per cent. less than the maximum of 10 per cent. was paid on the "A" Shares.

The net profits of the last Half Year were £2871; and the consumption of gas has nearly doubled in Ten Years. Large reserve fund.

Particulars and Forms of Tender (to be sent in by the 24th of May, 1904) can be had of the Secretary, Queen Street, Deal.

ISSUES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MR. ALFRED RICHARDS begs to notify that his ISSUES by AUCTION under PARLIAMENTARY POWERS of STOCKS and SHARES in LONDON, SUBURBAN, and PROVINCIAL GAS and WATER COMPANIES take place PERIODICALLY at the Mart, TOKENHOUSE YARD, E.C.

Terms for Issuing such Capital, and also for including Gas and Water Stocks and Shares belonging to Private Owners in these Periodical Sales, can be obtained on application at MR. ALFRED RICHARDS' OFFICES, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the

LEA BRIDGE DISTRICT GAS COMPANY.

NEW ISSUE OF £10,000 CONSOLIDATED ORDINARY STOCK AND £2000 FOUR PER CENT. PERPETUAL DEBENTURE STOCK.

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, May 17, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the

SWANAGE GAS AND WATER COMPANY.

NEW ISSUE OF £2500 FOUR-AND-A-HALF PER CENT. PREFERENCE "GAS" STOCK.

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION at the Mart, E.C., on Tuesday, May 17, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By Order of the Directors of the

CHIGWELL, LOUGHTON, AND WOODFORD GAS COMPANY.

NEW ISSUE OF £5000 CONSOLIDATED ORDINARY STOCK AND £1000 FOUR PER CENT. PERPETUAL DEBENTURE STOCK.

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, May 17, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

GREAT YARMOUTH WATER-WORKS COMPANY.

SALE BY AUCTION OF 500 £10 ORDINARY SHARES,

Ranking for 7 per cent Dividend, 4 per cent. having been paid on Similar Shares in the Company for 8 years' past.

The Company was Incorporated Fifty Years ago for supplying the important Seaport Town of Great Yarmouth and the surrounding Districts; and to keep pace with the increasing demand for Water, this further Capital for the construction of New Works is required. The water-revenue has risen from £14,226 in 1897 to £19,344 last year.

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, May 17, at Two o'clock, in Lots, by order of the Directors.

Particulars of Sale, with Form of Instructions for the Auctioneer or Secretary to purchase for Investors unable to attend the Auction, obtainable, post free of the SECRETARY of the Company, GREAT YARMOUTH, or of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

Mrs. M. A. Lester, deceased, and another.

GAS AND WATER STOCKS

IN THE

SOUTH ESSEX WATER COMPANY, and HORNSEY GAS COMPANY.

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, May 17, at 2 o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

SOUTHEND WATER-WORKS COMPANY.

NEW ISSUE, BY ORDER OF THE DIRECTORS, OF £15,900 FOUR PER CENT. PERPETUAL DEBENTURE STOCK.

This Company, established in 1870, supplies Water to a large and developing district, including the Borough of Southend-on-Sea, the population of which has increased from 7979 in 1881 to nearly 30,000 at the present time.

The water-rental Twelve Years ago was £6671; last year it exceeded £24,000; and at no time during the last thirteen years have the dividends been less than 5 per cent.

MR. ALFRED RICHARDS will issue by AUCTION, the above-mentioned DEBENTURE STOCK, at the Mart, Tokenhouse Yard, London, E.C., on Tuesday, May 17, at Two o'clock precisely, in Lots of £100 nominal each.

Particulars of Sale and Form of Instructions for the Auctioneer to purchase for investors who are unable to attend the Sale, may be obtained, post free, on application either to the Secretary of the Company, at 1, Princes Street, Westminster, S.W., or to the AUCTIONEER, 18, Finsbury Circus, LONDON, E.C.

TAR Contracts Wanted on the Sliding-Scale or at Fixed Prices.

Managers and Secretaries desirous of selling to best advantage please communicate with DENT AND CO., Ouse Chemical Works, SELBY.

CANTERBURY GAS AND WATER ACT, 1890.

SALE OF NEW "A" AND "B" STOCKS

IN THE

CANTERBURY GAS AND WATER COMPANY.

MR. FRANK AMOS is instructed by the Directors to SELL BY AUCTION, at the Mart, St. Margaret's Street, Canterbury, on Wednesday, May 18, 1904, at Three o'clock p.m. precisely.

£2500 NEW "A" AND "B" STOCKS

IN THE

CANTERBURY GAS AND WATER COMPANY

in 250 Lots of £10 each, authorized by the above-named Act.

Particulars and Conditions of Sale may be obtained of the Secretary, at the Offices of the Company, Castle Street, Canterbury, or of Mr. FRANK AMOS, F.S.I., 3, The Parade, CANTERBURY.

IMPORTANT SALE OF NEW ORDINARY STOCK.

OF THE

REDDITCH GAS COMPANY.

£5000 NEW ORDINARY STOCK

IN THE CAPITAL OF THE REDDITCH GAS COMPANY.

THE above Stock is authorized by the Redditch Gas Act, 1899, and is in addition to, and will rank *pari passu* with, the £40,000 Ordinary Stock already issued.

After reducing the price of gas and expending considerable sums out of profits in maintenance and improvements, dividends on the Ordinary Stock at the Standard Rate of 5 per cent. per annum have always been paid, and in several years an increased rate of dividend on the Ordinary Stock has been paid.

The Stock will be offered for SALE BY AUCTION by MESSRS. GRIMLEY & SON,

on Thursday, June 2, 1904, at the Grand Hotel, Colmore Row, Birmingham, at Seven o'clock in the Evening to the minute, in 50 Lots of £100 Stock each.

A Print of the Redditch Gas Act, 1899, and the last published Report and Balance-Sheet of the Company, may be inspected at the Office of the Company, situated at the Gas-Works, Redditch; or at the Offices of Messrs. SANDERS, PARISH, and THURSFIELD, Solicitors to the Company, situated at 67, Colmore Row, BIRMINGHAM, three days before the sale, or at the time of sale.

AUCTIONEERS' OFFICES, 39 and 40, Temple Street, BIRMINGHAM.

CASES FOR BINDING

QUARTERLY

VOLUMES OF THE "JOURNAL."

GREEN CLOTH, GILT LETTERED),

Price 2s. each.

ROBERT MARSHALL,

CANNEL COAL MERCHANT,

97, WELLINGTON STREET, GLASGOW.

Prices and Analysis of all the Scotch Cannels on Application.

UNEQUALLED.

Gas Companies are solicited to try Samples of the

MIRFIELD

BLACK BED GAS COAL.

Prices and Analysis on application.

MIRFIELD (GAS-COAL) COLLIERY COMPY.

RAVENSTHORPE, NEAR DEWSBURY.

THE

"ROTARY"

STATION METER.

Efficiency Demonstrated.

APPLY—

T. G. MARSH,

MAWSON CHAMBERS, DEANSGATE, MANCHESTER.

RAILS.

New and Second-Hand with all Accessories; also Tip Waggons and Turntables.

B. M. RENTON,

MIDLAND WORKS,

SHEFFIELD.

HEATHCOTE GAS COAL.

Rich in Illuminating Power and yield of Gas.

Above the Average in Weight and Quality of Coke.

Maintains a High Standard in Residuals.

THE GRASSMOOR CO., LD.,

CHESTERFIELD.

'BUFFALO' INJECTOR

Telegrams: "Temperature, London." Tel. No. 9060 London Wall.

GREEN & BOULDING,

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JOHN HALL & CO.,

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Manufacturers of

FIRE-BRICKS, LUMPS, TILES,

GAS RETORTS,

And every description of Fire-Clay Goods.

RETORTS CAREFULLY PACKED FOR SHIPMENT.

HENRY MILNES,

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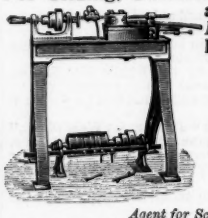
MANUFACTURER OF

HIGH-CLASS LATHES

For Sliding, Surfacing, Screw-cutting, and Plain Turning.



Milling Machines, Planing Machines, Slide Rests, Chucks, &c.

Lathes and Tools of my make may be inspected by any intending purchaser at addresses given below.

Agent for Scotland:

THOS. HILL & Co., 66, Robertson Street, Glasgow.

Agent for London: E. PADFIELD & Co., West India House, 96 & 98, Leadenhall Street, London, E.C.

TROTTER, HAINES, & CORBETT, LIMITED,
Brettell's Estate
FIRE-CLAY & BRICK WORKS,
STOURBRIDGE.

Manufacturers of GAS-RETORTS, GLASSHOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every description of FIRE-BRICKS.
Special Lumps, Tiles, and Bricks for Regenerative and Furnace Work.
SHIPMENTS PROMPTLY AND CAREFULLY EXECUTED.

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NEWBATTLE CANNEL.
Highest Results in Gas, & Excellent Coke.

QUOTATIONS ON APPLICATION TO
THE LOTHIAN COAL COMPANY,
LIMITED,
NEWBATTLE COLLIERIES,
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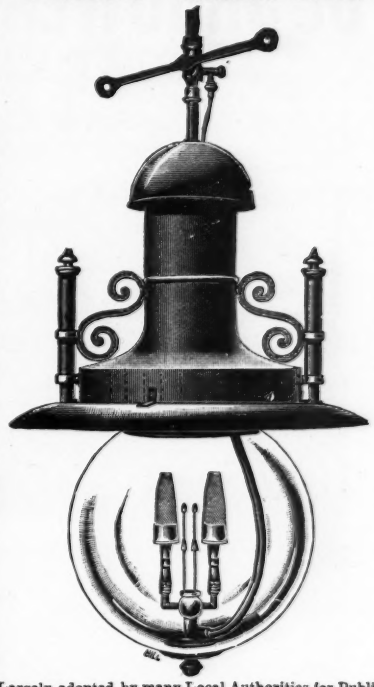
JAMES OAKES & CO.,
ALFRETON IRON-WORKS, DERBYSHIRE,
AND
Wenlock Iron Wharf, 21 & 22, Wharf Road, CITY ROAD, LONDON, N.,
Manufacture and keep in Stock at their Works (also large stock in London)
PIPES and CONNECTIONS, 1½ to 48 inches in diameter, and make and erect to order RETORTS, PURIFIERS, and TANKS, with or without planed joints, COLUMNS, GIRDERS, SPECIAL CASTINGS, &c., required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.
NOTE.—Makers of HORSLEY'S PATENT SYPHONS. These are cast in one piece, without Chaplets; doing away with Bolts, Nuts, and Covers, and rendering Leakage impossible.

THOMAS DUXBURY & CO.,
16, DEANSGATE, MANCHESTER,
Gas Engineers' Agents and Contractors for METERS, FIRE-CLAY GOODS, OXIDE OF IRON, AND ALL OTHER GAS APPARATUS.
Inquiries Solicited.
Telegrams: "DARWINIAN, MANCHESTER."
Telephone 1806.

THE
PETROLEUM GAS SYNDICATE
Supply and erect Complete Installations of their
PETROGENE PATENT GAS PLANT
On SALE, HIRE, or ROYALTY.
PETROGENE GAS is the most suitable Illuminant for all Towns, Villages, Factories, Institutions, &c., where a Cheap and Efficient Lighting System is required. It is equally suitable for Heating and Power purposes, and may be used with ordinary Gas Fittings, Stoves, Engines, &c. It may also be used in conjunction with Coal Gas, and affords Gas Companies a ready means of increasing their output without the expense of additional storage.
The Syndicate is prepared to entertain offers of sale of small Gas-Works, whether profit earning or not.
Offices: **28, Victoria St., Westminster.**
Works: **10, Rochester Row, S.W.**

THOMAS TURTON
AND SONS, LIMITED,
SHEAF WORKS, SHEFFIELD,
MANUFACTURERS OF
FILES OF BEST QUALITY
FOR ENGINEERS.
STEEL OF ALL DESCRIPTIONS.
SCREW STOCKS, TAPS AND DIES, SPANNERS, RATCHET BRACES, LIFTING JACKS, ANVILS, VICES, AND ENGINEERS' TOOLS GENERALLY.
LONDON OFFICE:
90, CANNON STREET, E.C.

THE PATENT
"BEACON" GLOBE LAMP.



Largely adopted by many Local Authorities for Public Lighting, being absolutely Shadowless and Wind-proo

H. GREENE & SONS, Limited,
Surrey Engineering Works,
Blackfriars Road, LONDON.
Telephone 1698 HOP.
Telegrams: "LUMINOSITY LONDON."

GENERAL HEATING & LIGHTING CO., LTD.,
(MOELLER'S SYSTEM.)
26, VICTORIA STREET, LONDON, S.W.

Greatest and most equal Distribution of Light.

Easily Cleaned.

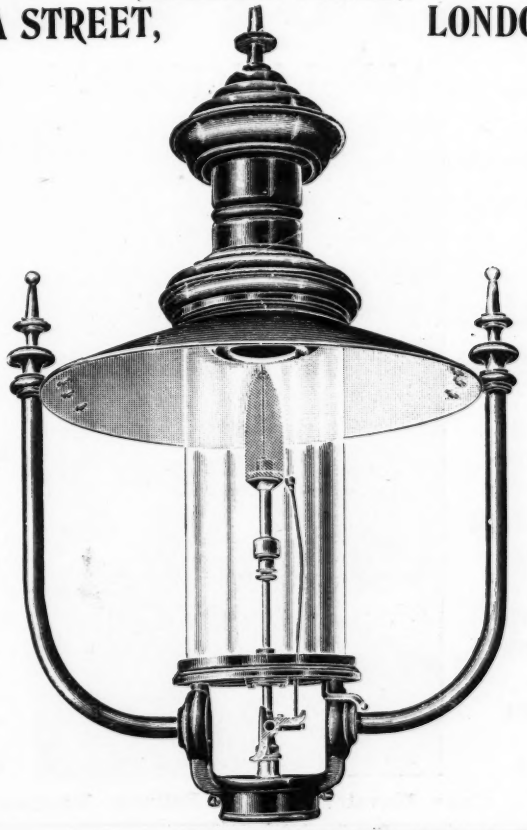
Renewal of Glass cheap.

Breakage of Glass reduced to a Minimum.

Enamelled Top and Reflector.

Low Price combined with Soundness of Construction.

Can be fitted to any frog.



Wind and Water Proof.

Top can be supplied Enamelled in all colours.

Price Lists of Lanterns and special Burners submitted on application.

Copper Lantern Top can be supplied if required.

No Repairs.

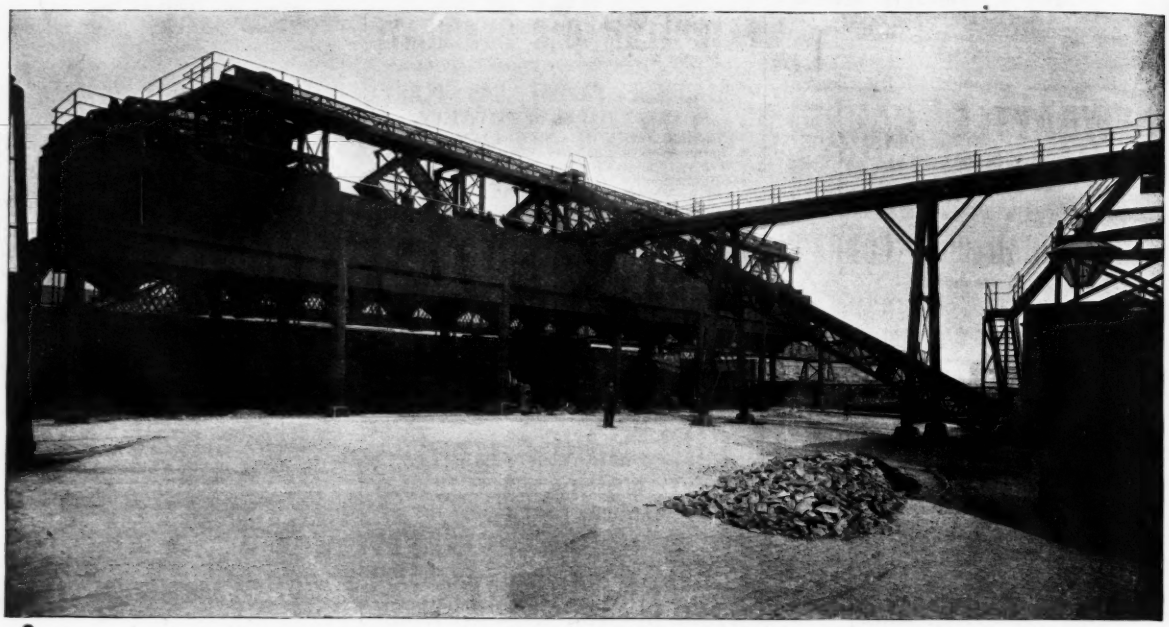
Artistic, graceful appearance.

A NEW SYSTEM OF STREET LIGHTING (Patent).

THE

DE BROUWER PATENT HOT COKE CONVEYOR

GUARANTEED BY SOLE MAKERS.



SALFORD CORPORATION GAS-WORKS—ALBION STREET WORKS.

W. J. JENKINS & Co., LIMITED, RETFORD.

Telephone No. 103. Telegraphic Address: "ELEVATOR, HASLINGDEN."

S. S. STOTT & CO.,

ENGINEERS HASLINGDEN, NR. MANCHESTER.

COAL AND COKE ELEVATORS & CONVEYORS.

COAL AND COKE STORAGE PLANTS.

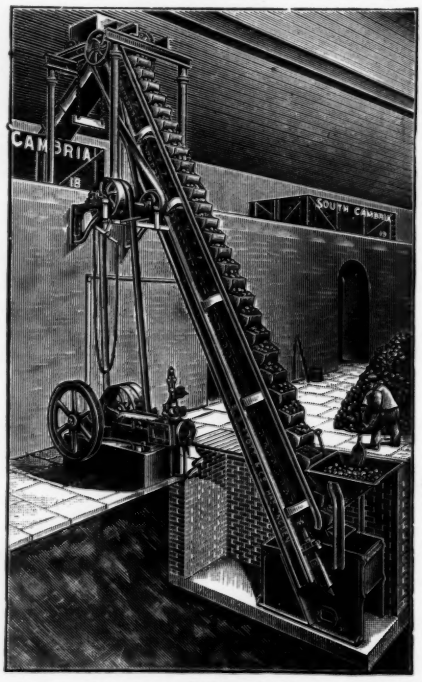
COAL AND COKE BREAKERS.

WHARF ELEVATORS FOR UNLOADING BARGES.

ELEVATORS & CONVEYORS for BOILER-HOUSES.

STAMPED AND RIVETED STEEL ELEVATOR BUCKETS.

DETACHABLE CHAINS AND SPROCKET WHEELS.



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LIME AND OXIDE ELEVATORS & CONVEYORS.

HIGH-CLASS STEAM-ENGINES up to 1000-Horse Power.

PUMPS, HORIZONTAL AND VERTICAL, SINGLE, DOUBLE, or THREE-THROW, for WATER-WORKS, &c.

BEAM PUMPING-ENGINES.

AIR-COMPRESSORS.

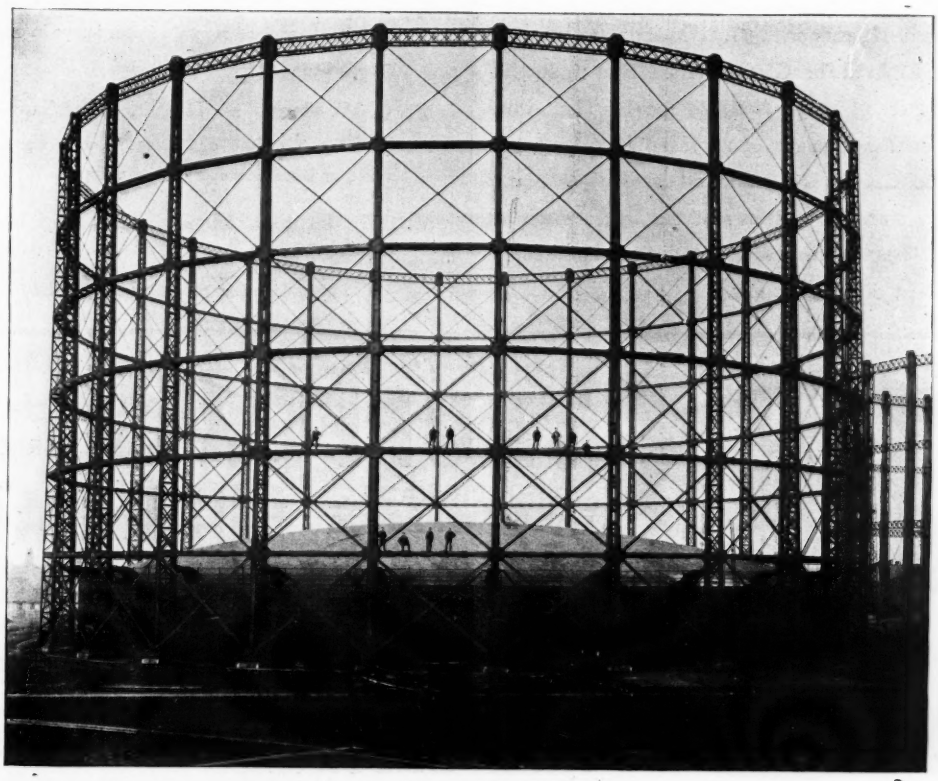
BELT PULLEYS, ROPE PULLEYS, GEARING, &c., &c.

Gasholders

ALL SIZES.

Designs of Every Description.

SEND FOR ESTIMATES.



VIEW OF GUIDE-FRAMING OF THREE-LIFT GASHOLDER, 250 FT. BY 50 FT. (FROM A PHOTO.)

Made and Erected

by

ASHMORE, BENSON, PEASE, & CO., LTD.,

Stockton-on-Tees.

Telegrams:
"GASHOLDER."

Published Weekly

THE LUCAS LIGHT RECORDER

Issued in the interests of the Gas Industry and the finest high-power Gas Lamp known

Price 0d

No. 40.] [*Tuesday, May 10, 1904.*

Another Gold Medal.

The friends of the Lucas Light—and they are many—will be gratified to learn that another official recognition has fallen to its share.

A Diploma of Honour with Gold Medal was awarded to the Lucas Light at the Glasgow East End Industrial Exhibition (Dec. 9, 1903—April 9, 1904). The award was secured on the strength of an installation of Lucas Lamps in the Concert Hall and other Sections of the Exhibition, undertaken and carried out in an excellent manner by Messrs. James Milne and Son, Limited, of 111, St. Vincent Street, Glasgow.

Recent Testimonials.

Among testimonials lately received by MOFFAT'S LTD., 155, Farringdon Rd., E.C., may be quoted:

Mr. JNO. PATERSON, Manager, Gas-Works, Rushbrooke, writes:

"We have fixed several of your lamps in our district, and they are giving every satisfaction."

Mr. C. W. MARSHALL, Draper, Faversham—

"The Two 500 c.p. Lucas Lamps we bought of you some time since give every satisfaction."

Mr. H. BADHAM, Shop Fitter, 127, Moore Street, Birmingham—

"The outside Lamps are perfectly satisfactory."

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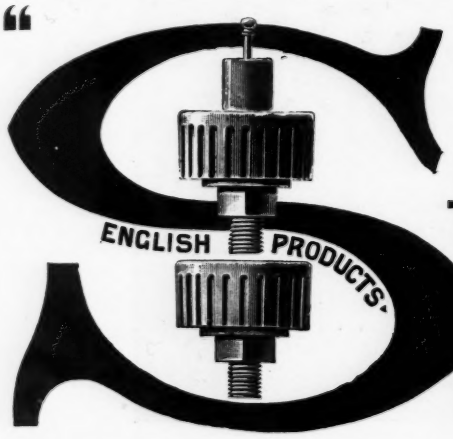

A BOON TO MASTER, MAN, and MACHINE.

STAUFFER'S REG. TRADE MARK.

CENTIGRADE FOR HOT PLACES **LUBRICANT"**

STANDARD MACHINE GREASE.

SAVING UP TO 90 PER CENT. OVER LIQUID OIL.

Patent "Unbreakable" & "Telltale" Stauffer Lubricators.

SOLE MAKERS—

TRIER BROS., 1, GT. GEORGE ST., WESTMINSTER, LONDON.

CUMBERLAND WORKS, NEW CHURCH RD., CAMBERWELL

MOBBERLEY & PERRY,

STOURBRIDGE.

Give SPECIAL and PERSONAL ATTENTION to the execution of all orders

Bricks for Water Gas Plants and Chequer Bricks always in Stock.

INCLINED, HORIZONTAL, & SEGMENTAL RETORTS OF BEST QUALITY.

BIGGS, WALL, & Co.

13, CROSS STREET, FINSBURY PAVEMENT, LONDON, E.C.

Telegrams: "RAGOUT, LONDON." Telephone 273 CENTRAL.

METHANE-HYDROGEN WATER-GAS PLANT.

3 gallons Tar and 20 lbs. Coke produce 1000 cubic feet 10 to 12 Candle Power Gas of the following composition—

Hydrogen	54·4 per cent.
Methane	12·0 „ „
Unsaturated Hydrocarbons	3·0 „ „
Carbon Monoxide	15·0 „ „
Nitrogen and Carbon Dioxide	5·6 „ „
	100·0
Calorific Value	400 B.T.U.

See **Prof. VIVIAN B. LEWES'S** Lecture before Society of Arts, reported in the "JOURNAL OF GAS LIGHTING," Dec. 9, 1902.

JÄGER'S PATENT GRIDS.

CAPACITY OF PURIFIERS DOUBLED

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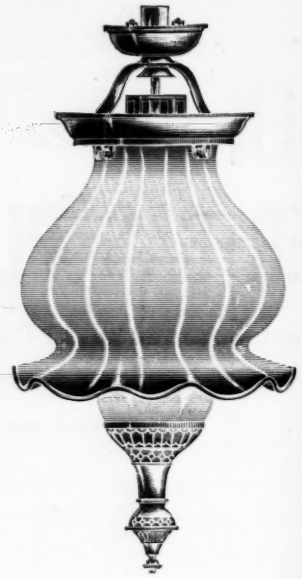

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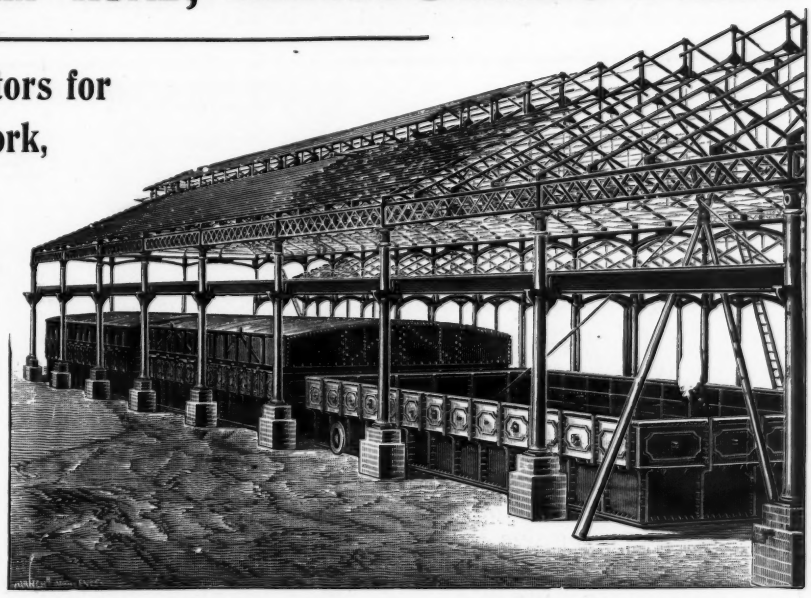

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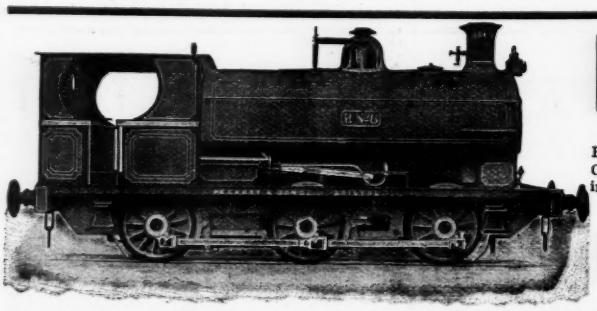

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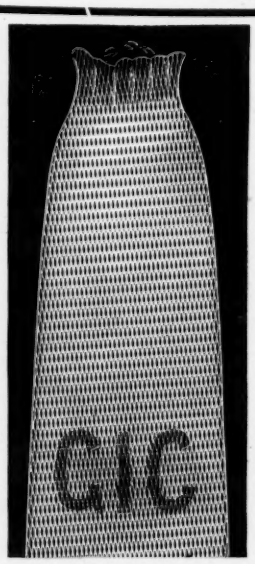

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Printed for WALTER KING by King, Sell, & Olding, Ltd.; and Published by him at 11, BOLT COURT, FLEET STREET, in the CITY OF LONDON.—Tuesday, May 10, 1904.